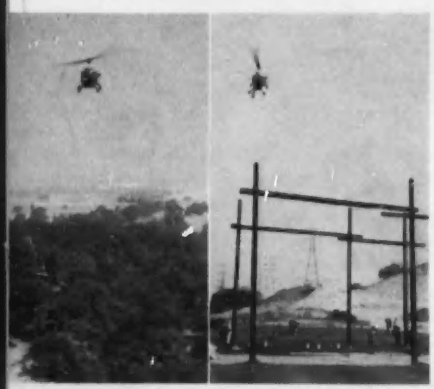
ELECTRICAL WEST

January 1954
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

Switch to All-Electric 72

"Leapfrog" to Relight Hiller 74



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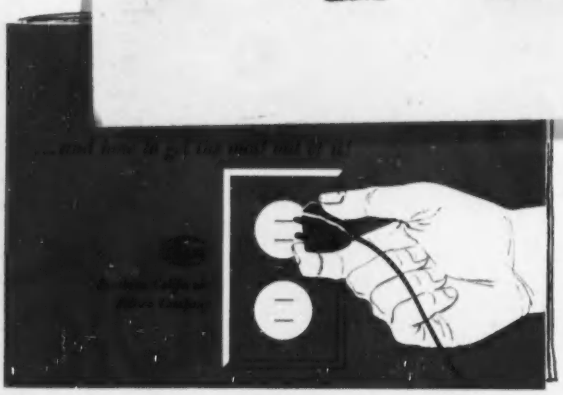
WA
PAG

Shown here is the cover of a booklet which contains pertinent information about electric service. It is presented by each of our district offices to each new customer in its area, along with a "Welcome, new customer . . ." note.

Included in the booklet are facts about the proper care and efficient use of electrical appliances, which make the book valuable from the point of view of both homemakers and appliance dealers. It is valuable in another way, too: Edison sells no appliances; the welcoming note is a friendly hand extended in greeting to *your* customers, as well as ours—another part of the "Edison tells them, and the dealer sells them!" program which has been building appliance sales in Central and Southern California for over half a century!



Edison

SOUTHERN CALIFORNIA EDISON COMPANY

Cut glassware breakage up to 80% with G-E spun-sealed luminaires

AVY

GES

Replacing glassware for G-E spun-sealed street-lighting luminaires costs an average of 12 cents per luminaire **per year.** Compare that to replacement costs for ordinary glassware, in the comparison chart below, and you will see why G-E optical assemblies with the exclusive G-E spun-sealed design have brought amazing savings wherever they have been adopted.

In addition to greatly reduced glassware breakage—in service and in shipment—G-E spun-sealed assembly keeps glassware interiors clean for more efficient light utilization, and completely eliminates chipping of the refractor edge.

The economical, practical advantages of spun-sealed design are available on all standard G-E fixtures.

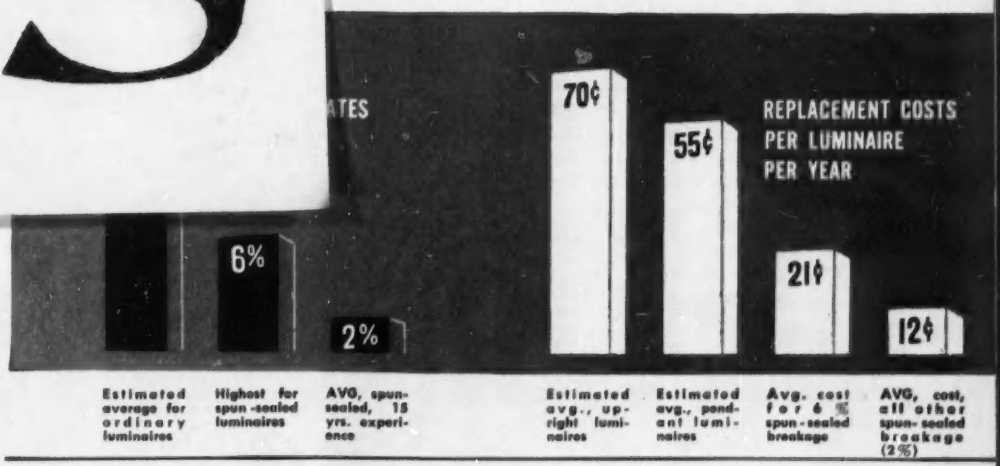
For more information on how you can benefit by using G-E spun-sealed optical assemblies, contact your nearby G-E Apparatus Sales Office, or Authorized G-E Street-lighting Agent. General Electric Company, Schenectady 5, N. Y. 452-138

A. No gasket at weatherproof joint reduces maintenance costs.

B. Reflector fully protects glassware lip from damage in shipping and storage.

C. Spinning operation weeds out any defective glassware at factory.

D. Pressed globes and refractors have exceptional strength and uniformity.



Quality lighting at less cost with G-E engineered equipment.

You can put your confidence in—

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Welcome, new customer...

It is always pleasant to find a new name on our district list—whether it's a brand new Southern California Edison Company customer or someone we have served previously at another location.

This book contains information on many of our services and tells how electricity can help you live more comfortably. Other such information will be sent to you regularly in our bi-monthly publication "Electrical Times."

We have been serving this area for more than half a century, and are constantly seeking ways to serve it better. Your suggestions and comments will be welcome.

W. L. PHILLIPS
District Manager, Whittier

Edison

Shown here is the cover of a booklet which contains pertinent information about electric service. It is presented by each of our district offices to each new customer in its area, along with a "Welcome, new customer . . ." note.

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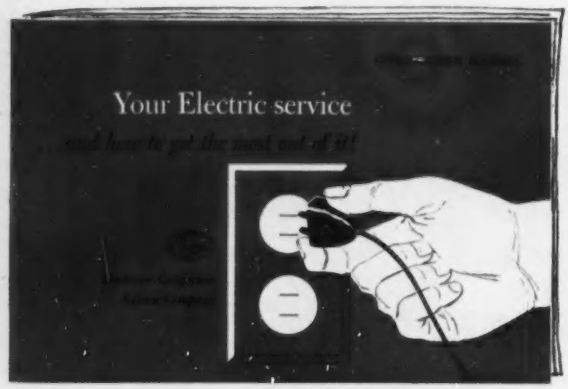
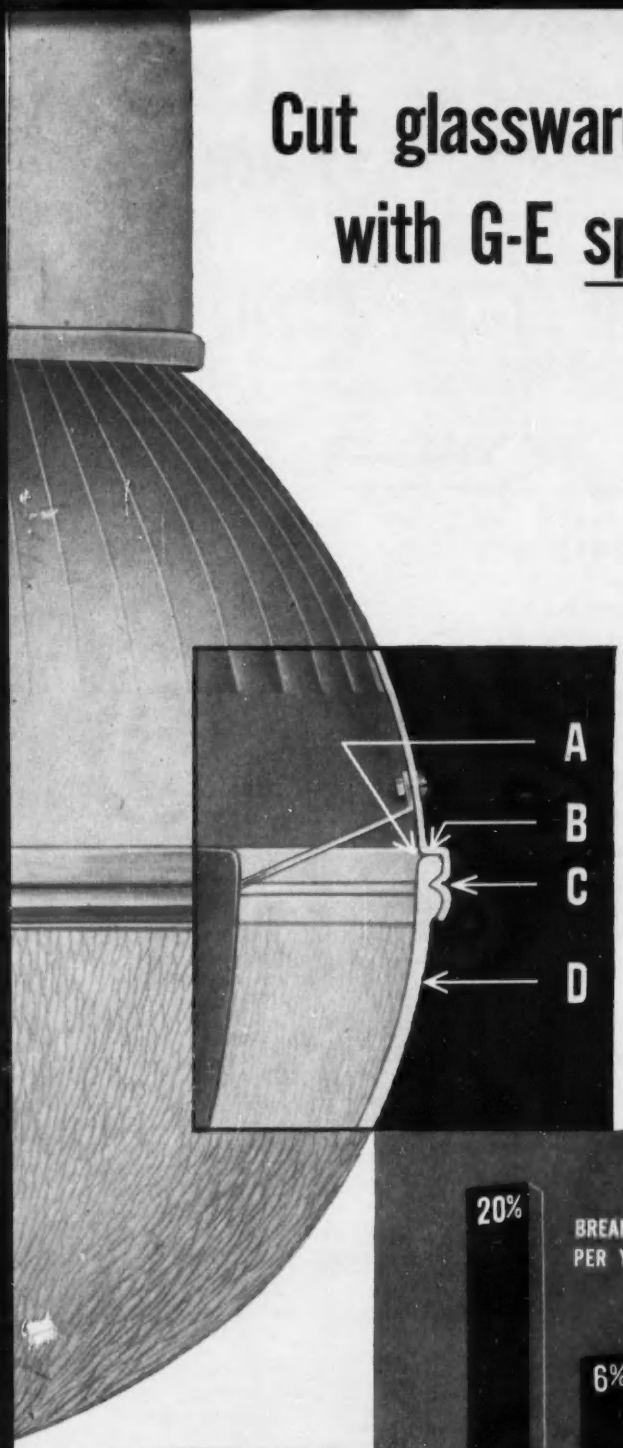


Southern California Edison

SOUTHERN CALIFORNIA EDISON COMPANY

Cut glassware breakage up to 80% with G-E spun-sealed luminaires



Replacing glassware for G-E spun-sealed street-lighting luminaires costs an average of 12 cents per luminaire **per year.** Compare that to replacement costs for ordinary glassware, in the comparison chart below, and you will see why G-E optical assemblies with the exclusive G-E spun-sealed design have brought amazing savings wherever they have been adopted.

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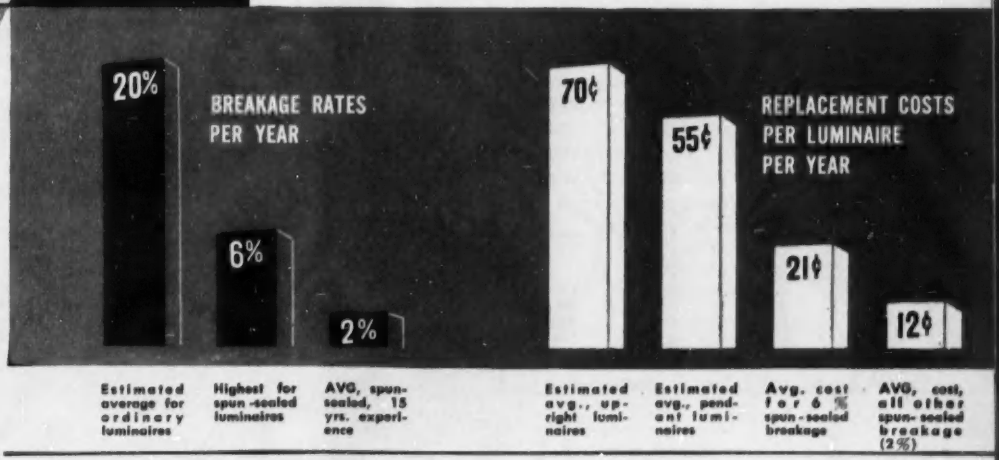

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GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

JANUARY 1954

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-sixth year of publication

VOL. 112 NO. 1

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor
Peggy Boyer, Associate Editor
Walter C. Heston, Engineering Editor
John Cootz, Typography

Next Month

The February issue is the annual statistical and review number. Everyone knows that 1953 was a record year for utility construction activity and it will be interesting to see what the industry plans for 1954. At this writing it appears that load growth has tapered off slightly and that 1954 construction will be no greater than during the past year. New generation will reach an all-time high of more than 2,000,000 kw.

In addition to the summary of industry accomplishments and outlook for the Far West, there will be the usual national statistics for the industry.

Electrical West's exclusive "Calendar of New Generation" will be compiled again this year.

Sales statistics and reports from utilities will not be included in the February issue hereafter. Power companies have complained that it was too early to review past year's activities. This information will be compiled for either the March or April issue. However, there will be an outlook report from sales managers in February.

Every sign points to great pressure on sales for 1954. The day of the order taker is over. Some concerns have said to their salesmen, "Step on it or else."

Trade notes, news and letters will be carried.

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New L-M Manual Remote Control for Reclosers Saves Trouble Trips, Improves Customer Service

L-M's Remote Control for Kyle Type H Reclosers provides manual operation from the base of the pole. It eliminates the need for climbing the pole. No switch stick is needed. Anyone can be instructed to operate the device. The handle can be locked to prevent unauthorized operation.

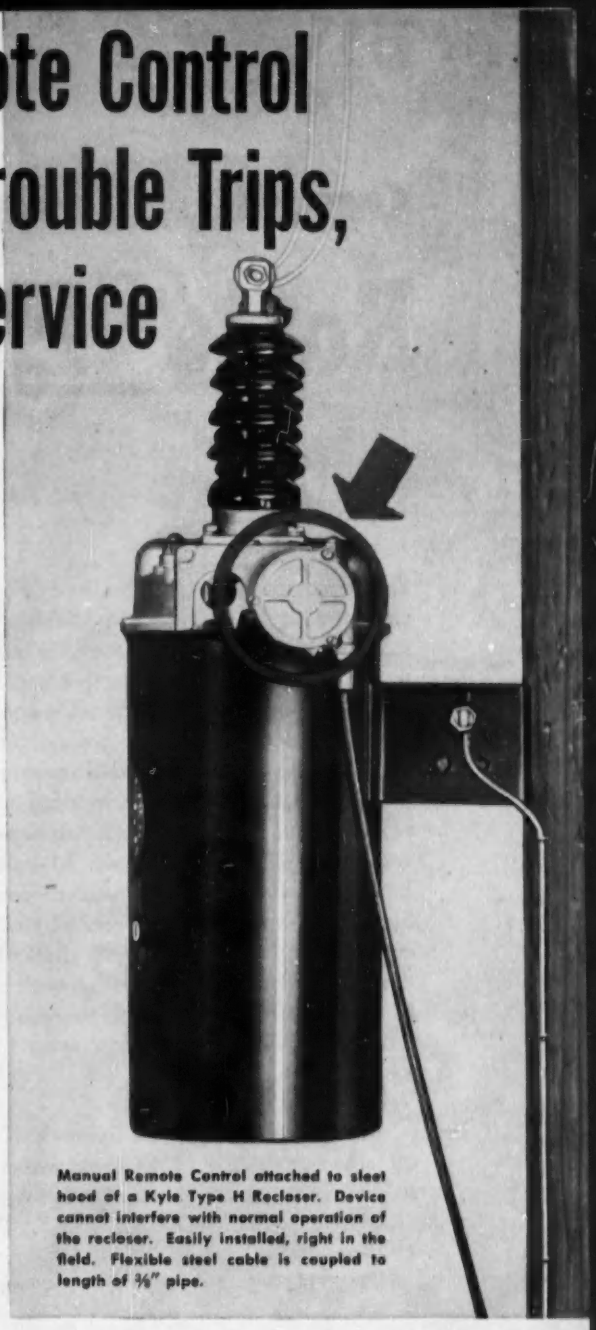
Use of the device eliminates the need for sending a line crew to open or close a recloser. Farmers or property owners in remote locations can be provided with a key so that they can operate the control upon telephone instructions. This can be particularly valuable when roads are blocked by mud or snow. The saving on one service trip by a crew more than pays for the device.

Let Us Give You Complete Information

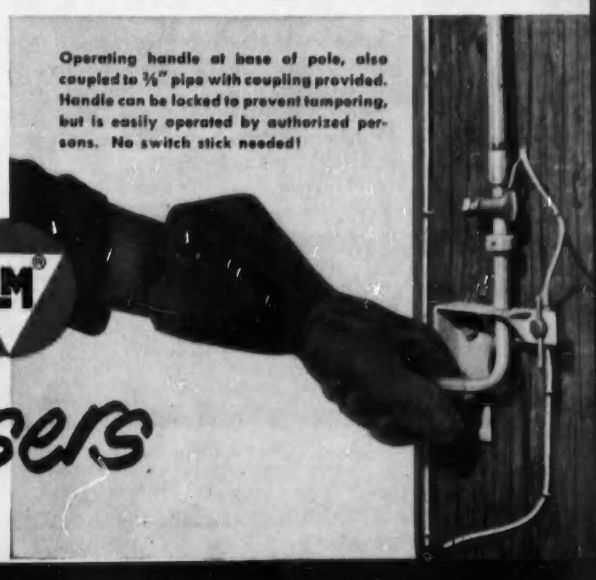
Ask the Line Material Field Engineer for details on the L-M Remote Control, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Features of the L-M Manual Remote Control for Kyle Reclosers

- Designed for simple operation from the base of the pole.
- No switch stick required.
- Permanently lubricated for a lifetime of use. Sealed against damage or interference by insects and weather.
- Allows trip-free operation under fault conditions. The device cannot hold recloser in against a fault.
- Easily installed; may be added to Kyle Reclosers right in the field.
- Control handle can be locked to prevent tampering.
- Available for pole or cross-arm mounting for 1-, 2-, or 3-phase operation. One handle operates all reclosers simultaneously.
- Field-tested under various climatic conditions to assure positive operation.



Manual Remote Control attached to steel hood of a Kyle Type H Recloser. Device cannot interfere with normal operation of the recloser. Easily installed, right in the field. Flexible steel cable is coupled to length of ⅜" pipe.



Operating handle at base of pole, also coupled to ⅜" pipe with coupling provided. Handle can be locked to prevent tampering, but is easily operated by authorized persons. No switch stick needed!

LINE MATERIAL

Kyle® Reclosers

Gruelling tests prove that Rome • EMT is welded

The accompanying unretouched photographs show the results of the most punishing tests ever inflicted upon an electrical metallic tubing. Note that Rome • EMT has been compressed, flattened, flared and expanded—*yet the weld holds as firm as the metal itself* . . . further proof of the superior quality of this lightweight steel raceway.

Such "built-in" precision welding is only one of many important structural advantages you get with Rome • EMT. Light in weight and easy to bend, it assures fast, economical installation. Simple compression type fittings eliminate thread cutting and permit rapid, moisture-tight connections. A mirror-smooth interior surface makes wire pulling easy. And its electrogalvanized exterior affords utmost protection against corrosion and abrasion.

Underwriters' approved, Rome • EMT exceeds all standards for thin wall raceways. Ample stocks are now available in the following sizes:

STRAIGHT LENGTHS—½", ¾", 1", 1¼", 1½" and 2".

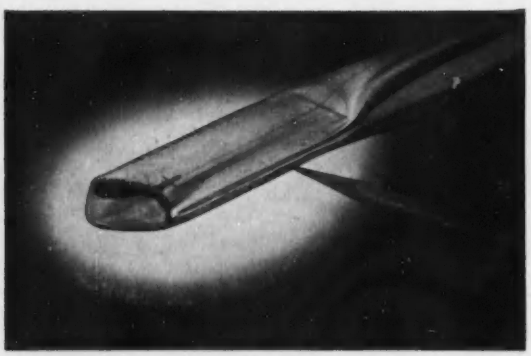
90° ELBOWS—¾", 1", 1¼", 1½" and 2".

Warehouse stocks located as follows:

Chicago, Ill.	San Francisco, Calif.
Dallas, Texas	Seattle, Wash.
Denver, Colo.	St. Paul, Minn.
Los Angeles, Calif.	Torrance, Calif.

Salt Lake City, Utah

SQUEEZED like an accordion by tons of pressure—yet the Rome • EMT weld holds firm . . . proving the weld to be as strong as the tube walls themselves.



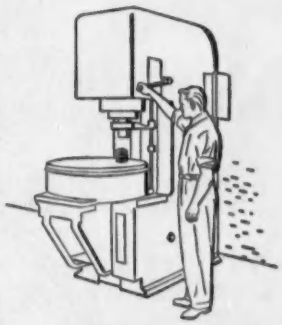
FLATTENED like a pancake—actually creased along the weld. But look at the weld itself. It remains unbroken and as good as ever.

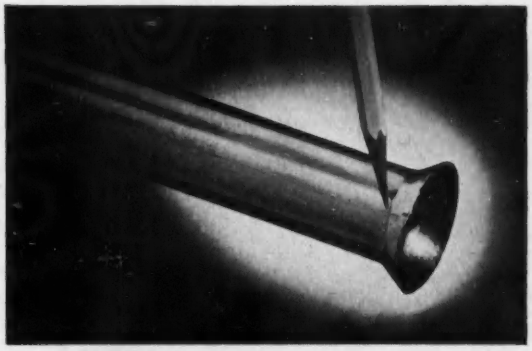
ROME CABLE *Corporation*
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE ROME, N.Y.

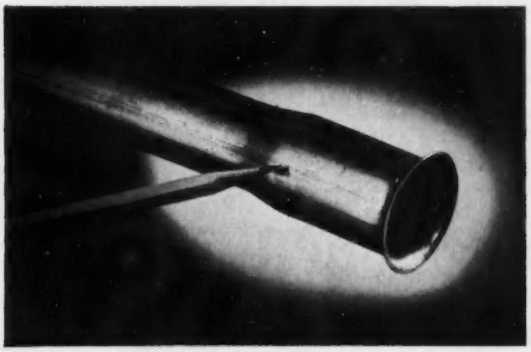
It Costs Less to Buy the Best

Forever!





FLARED while cold during a cone test. And note the weld. There's not a single indication of a break.



EXPANDED 25% and flared. If weld weakness existed, this test would surely find it. Yet look at it —strong as ever . . . proof positive of Rome • EMT's superiority.

The Rome • EMT used in these tests is 1" in diameter, .049" in wall thickness.

For unexcelled wire and cable performance:

ReFlex ReMarine ReBarn RePrene® ReZone® Rome Synthinol® ReLene

Test it yourself!

Get a Free Sample of Rome • EMT

Rome is anxious for you to actually see EMT—to feel its light weight, its mirror-smooth surface—to test its weld yourself . . . and compare it with any other light-weight metallic conduit on the market today. For your free sample, please write us on your company letterhead. Address Rome Cable Corporation, Rome, N. Y.

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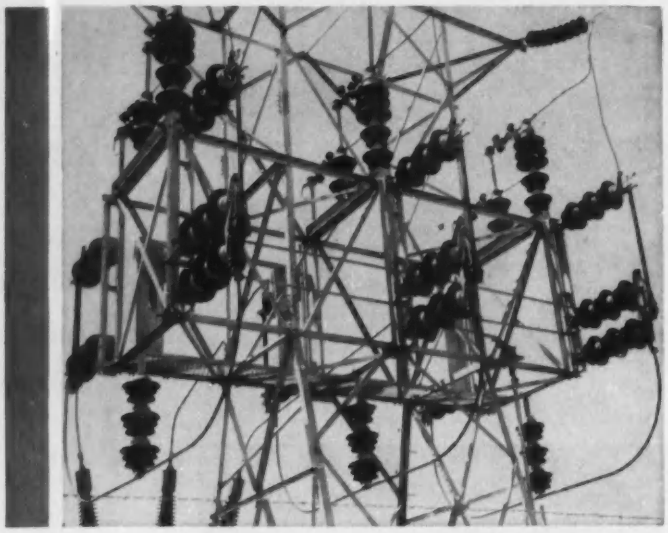
Schwager-Wood Group Operated

VERTICAL BREAK SWITCHES TYPE TA

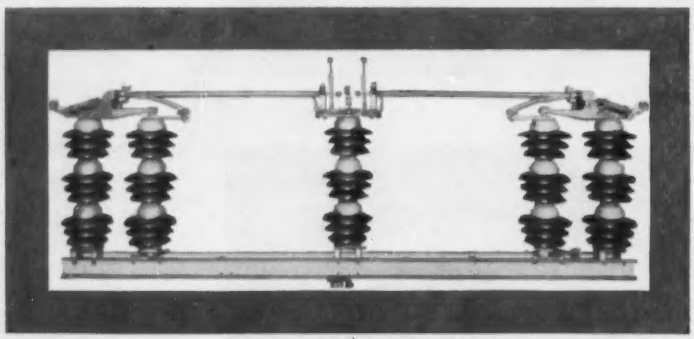
7.5 KV through 330 KV 400, 600, 1200, 1600, 2000 and 3000 Amperes

• Extra long breaking distance is achieved in the design of Schwager-Wood Type TA Switches by hinging the blade over the rear stack of insulators. This feature has contributed largely to their popularity. The increased breaking distance ranges from 75% in a 7.5 KV switch to 30% in a 115 KV, over a conventional design. Longer transmission lines can be dropped and heavier load or exciting currents can be interrupted than would be possible in switches with the blade hinged over the center insulating stack.



Illustrative of the versatility of Schwager-Wood Type TA Switches is the fact that the relocation of a single pin, in the counter balance mechanism, changes operation from horizontal to vertical—and vice versa.

Illustrated below is a Schwager-Wood Type TA single pole bus selector switch—115 KV—600 Ampere. Selector switches are available in all voltage and amperage ratings.



Technical information and prices available on request from any of our regional representatives or the home office, 8024 S.W. 35th Avenue, Portland 19, Oregon. Phone CHerry 7588

SCHWAGER-WOOD CORPORATION

High Voltage Switchgear • Substation Design, Equipment • Bus Fittings, Connectors **PORTLAND, OREGON**

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P. O. Box 287
Johnson Sales Co.
Phone 3-6413

BILLINGS, MONTANA
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Victor L. Wisoki
Phone 9-3175

BIRMINGHAM, ALABAMA
447 American Life Bldg.
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Phone 7-1917

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Central States Eng. & Prods. Co.
Phone WAbash 2-1824

DALLAS, TEXAS
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Phone Lakeside 1473

DENVER, COLORADO
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Slaybaugh-Thompson Co.
Phone AComa 5826

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Charles L. Ward Co.
George W. Swallow
Phone 7-4769

EL PASO, TEXAS
P. O. Box 347
Phillips Electric Eqpt. Co.
Phone 3-1611

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Charles L. Ward Co.
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125 Barclay Street
Russell D. Heath
Phone DIgby 9-1500

OKLAHOMA CITY 14, OKLA.
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Phone 5-5378

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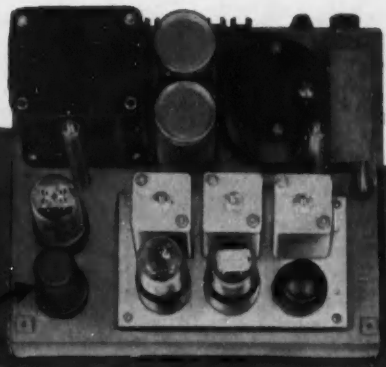
TACOMA 2, WASHINGTON
1914 Market Street
Love Electric Co.
Phone BR 4104

New WESTON Inductronic® D-C AMPLIFIER

Measures Millivolts to 0.1%!...



The new Weston Inductronic D-C Amplifier measures both millivolts and microamperes to an accuracy previously unheard of. A product of Weston Electrical Instrument Corp., Newark, N. J.

Its resistor network uses D-H ALLOY to assure HIGH STABILITY and ACCURACY

The Weston Resistance Network (Actual size) is wound with D-H Manganin wire to achieve a high degree of stability with extreme accuracy.

When it's millivolts or microamperes you are measuring, you talk in terms of accuracy in the order of 0.1%. Here is the most accurate measuring instrument yet developed — the Weston Inductronic D-C Amplifier. This amazing instrument makes potential measurements down to microvolts, current measurements to fractions of a microampere.

By using this 200 kc frequency shift amplifier in connection with thermocouples, radiation receivers, bolometers, strain gages, pressure transducers, resistance thermometers, photocells, ionization gages, etc., related physical quantities can be measured with speed and accuracy far superior to any other method previously known.

The amplifying system is essentially an automatic potentiometer, wherein an output current is maintained in balance against the input through a method of accurately adjusted resistors determining the balanced ratio of output to input. With a high gain in the amplification of error unbalance, the accuracy of amplification ratio is of course dependent almost entirely upon the *stability* and *precision* of the resistor network.

For this most exacting function Weston uses Driver-Harris MANGANIN, an alloy of such fixed stability that maximum change in resistance between 15°C. and 35°C. is less than *15 parts per million per degree Centigrade.*

If fixed stability and constant resistance under normally variable operating conditions are "musts" in *your* resistor designs, let us have your specifications. We'll gladly put at your disposal 50 years of alloy manufacturing experience to help solve your problem.

*Sole producers of world-famous Nichrome**

Driver-Harris Company

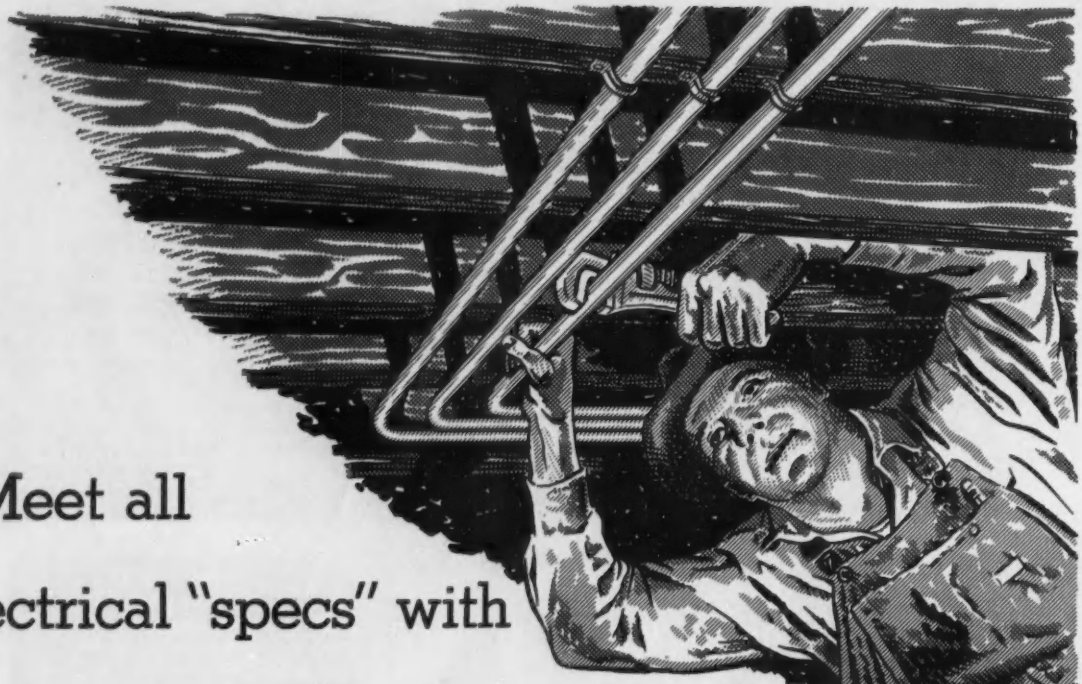
Western Representative: **ANGUS-CAMPBELL, INC.**

5320 Santa Fe Ave., Los Angeles 58 917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

*T.M. Reg. U.S. Pat. Off.

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD



Meet all electrical "specs" with Youngstown Buckeye Conduit!

CONTRACTOR TELLS WHY HE'S FOR BUCKEYE: "When wiring homes, I refuse to take short cuts. That's why I use Youngstown Buckeye rigid steel conduit. That's the conduit approved for all types of building construction and occupancy—for tomorrow's demands as well as today's. Buckeye gives wiring complete protection. Home owners like to know that."

LISTEN TO THIS CONSULTING ELECTRICAL ENGINEER: "Only full weight standard threaded rigid steel conduit is approved by the Code as moisture, dust and explosion proof for use in hazardous locations. That's why I always specify Youngstown Buckeye conduit. In addition, I find that the strength and permanence of Buckeye conduit is appreciated by builders."

Youngstown manufactures full weight standard threaded rigid steel conduit from start to finish. This assures better steel and consistency of quality in manufacture. Only top grade steel gives complete long term protection. When you buy or specify Youngstown Buckeye conduit, you know you're meeting all construction requirements.

Shipments of Buckeye rigid steel conduit are now being made from our conduit mills at Indiana Harbor and Youngstown.

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

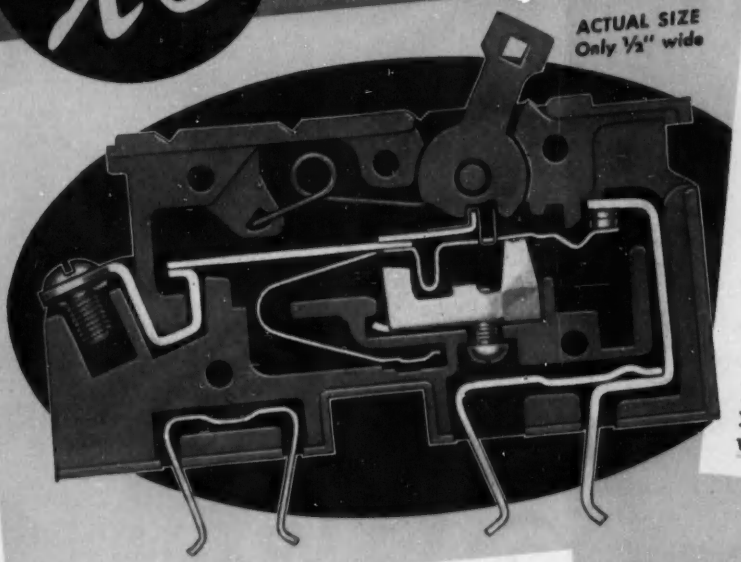
Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices — Youngstown 1, Ohio

Export Office-500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS · ELECTROLYTIC TIN PLATE · COKE TIN PLATE · WIRE · PIPE AND TUBULAR PRODUCTS · CONDUIT · RODS · SHEETS · PLATES · BARS · RAILROAD TRACK SPIKES

See XO CIRCUIT BREAKER
FOR LOW-COST LOAD CENTERS



Amazingly Simple —yet All the Features!

Climaxing nearly twenty years' design leadership in the residential circuit breaker field, Square D now offers this new and remarkably simple type of mechanism. Study the sectional illustration at left—see how simplicity of design (only 3 moving parts) provides accurate, positive operation! See how this same simplicity gives you every worthwhile operating characteristic you want in a circuit breaker—without cost penalty!

QUICK-MAKE, QUICK-BREAK at no extra cost and without use of coil springs. Spring shown above merely positions handle—has no function in breaker operation.

Positive Operation insured by action of handle cam directly against contact arm. No spring coupling.

AUTOMATIC RE-LATCHING. Trips to "OFF." The circuit is restored by simply moving handle to "ON."

Compact. 15-20 ampere, single pole units are only ½" wide. 15-20-30-40-50 ampere, double-pole are only 1½" wide, yet accommodate the larger wire sizes.

AMBIENT COMPENSATED at no extra cost. Additional bimetal automatically regulates operation to surrounding atmospheric conditions—prevents needless tripping.

Thermal-Magnetic. 2-way protection against heavy overloads and short circuits.

SHOCK RESISTANT. Simplicity of design, light weight moving parts, and new type spring loading—all combine to make breaker unusually resistant to vibration or shock.

Plug-in Mounting for easy, fast connection to line bus. Steel reinforced, positive pressure clip has been performance-proved on millions of Square D products.

NON-TAMPERABLE ASSEMBLY. Breaker unit width varies with capacity. Impossible to interchange high capacity ratings with smaller sizes.

SO EASY TO STOCK, ASSEMBLE AND INSTALL

ONLY 3 COMPONENTS

- box and interior
- plug-in breaker units
- flush and surface covers

1 TO 32 CIRCUITS WITH ONLY 6 ENCLOSURES

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

Watch for Square D's Display Coach—Now on Tour!

DISTRIBUTION TRANSFORMERS
different from others because.....

...Nitrile rubber gaskets at all tank openings prevent breathing...seal out contamination

You get years of extra service from your General Electric Spirakore* distribution transformer because "we stopped their breathing to prolong their life." **EVERY OPENING**—cover, handhole, high- and low-voltage bushings—is sealed with a nitrile rubber gasket. These gaskets resist oil, sunlight and atmosphere . . . they require no cement . . . are easily removed *and used again and again.*

This air-tight seal maintains the high dielectric strength of the oil . . . prolongs the life of the insulation.

REMEMBER . . . all transformers are not alike . . . compare the General Electric plus features in the chart below and see for yourself.

For more information on distribution transformers, either unit-type or conventional, contact your nearest G-E sales office, agent or distributor, or write to General Electric Company, Section 431-5, Schenectady 5, New York.

*Registered trade-mark of General Electric Co.

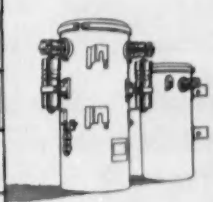
You can put your confidence in—

GENERAL ELECTRIC

ALL TRANSFORMERS ARE NOT ALIKE

(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	YES	NO	NO	NO	NO	NO
Nitrile rubber gaskets at all tank openings	YES	NO	NO	NO	NO	NO
Strenicor pressure terminal clamps	YES	NO	NO	NO	NO	NO
Insulated clamp-type connectors on tank wall hv bushings	YES	YES	YES	NO	YES	YES
One-piece cover band	YES	NO	NO	NO	NO	YES
Gapped valve-type arresters	YES	NO	NO	NO	NO	NO
Nationwide company-operated service facilities	YES	YES	NO	NO	NO	NO



UNIT-TYPE CONVENTIONAL

"Take your choice G. E. makes both"

ELECTRICAL INSULATION IS OUR SPECIALTY

Q. What ONE wire and cable producer grows its own natural rubber, and makes its own synthetic rubber?

A. UNITED STATES RUBBER COMPANY.

Q. What ONE wire and cable producer makes plastics?

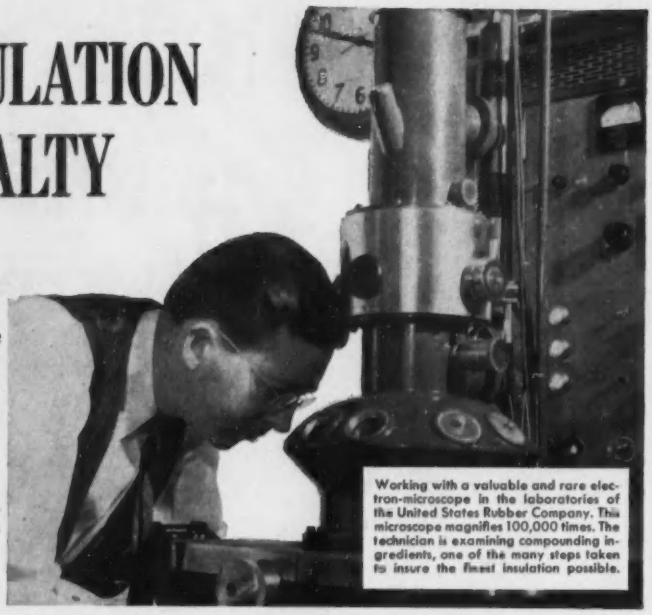
A. "U. S."

Q. What is the most important part of wire and cable?

A. The insulation.

Q. Who is best equipped to make wire and cable with superior insulation?

A. U. S. RUBBER—which grows its own natural rubber, makes its own synthetic rubber, manufactures its own plastics.



Working with a valuable and rare electron-microscope in the laboratories of the United States Rubber Company. This microscope magnifies 100,000 times. The technician is examining compounding ingredients, one of the many steps taken to insure the finest insulation possible.

Isn't it logical that a rubber company should make the best wire and cable insulation there is? U. S. Rubber has been a pioneer in insulation for over 70 years—has amassed in that time a stockpile of research data and experience that can't be beat. Electrical insulation is a "U. S." specialty!

Electrical insulation makes the difference between superior and ordinary wire and cable. Conductors of all manufacturers are standard, but insulation must be the best that science can produce. That's why your best bet in wire and cable is U. S. Rubber.

SOME MORE OF THE MANY DIFFERENT VARIETIES OF "U. S." WIRE AND CABLE

UTILITIES: Power Cables • Street Lighting • Royal Cords • Network Cables • Utility Control • Pole & Bracket Cable • Service Entrance • Weatherproof • Zip Cord Pole Fixture Cable • Sup. Control

RAILROADS: Power Cables • Communications • Railway Signal • Royal Cords • Welding Cable • Railway Utility • Sup. Control • Weatherproof

HEAVY INDUSTRY: Power Cable • Royal Cords • Welding Cables • Control Cables • Machine Tool Wire • Building Wire • Switchboard Wire • Thermostat Cable • Bus Drop Cable

ONE OF MANY SUPERIOR "U. S." WIRE AND CABLE PRODUCTS

USKORONA-NEOPRENE POWER CABLES

Ozone-resistant for high-voltage applications in wet or dry locations.

These cables are for use on power distribution, street lighting and station control circuits and for general-purpose wiring on circuits up to 8000 volts between phases and at conductor temperatures up to 75 C. They will not crack after 3 hours in air containing .015 per cent ozone. They are light in weight, easy to install and join, and are resistant to oil, heat, sunlight, flame, acids, alkalis and corrosive chemicals. Uskorona-Neoprene cable also eliminates electrolysis. The following are guaranteed test values:

PHYSICAL AND AGING PROPERTIES (MINIMUM VALUES)

	Uskorona			Neoprene Jacket	
	Unaged	After 96 Hrs. O.B.	After 7 Day Geer Oven	Unaged	After 96 Hrs. O.B.
Tensile Lbs./Sq. In.	500	450	450	1800	1600
Elongation Per Cent	250	200	200	300	250

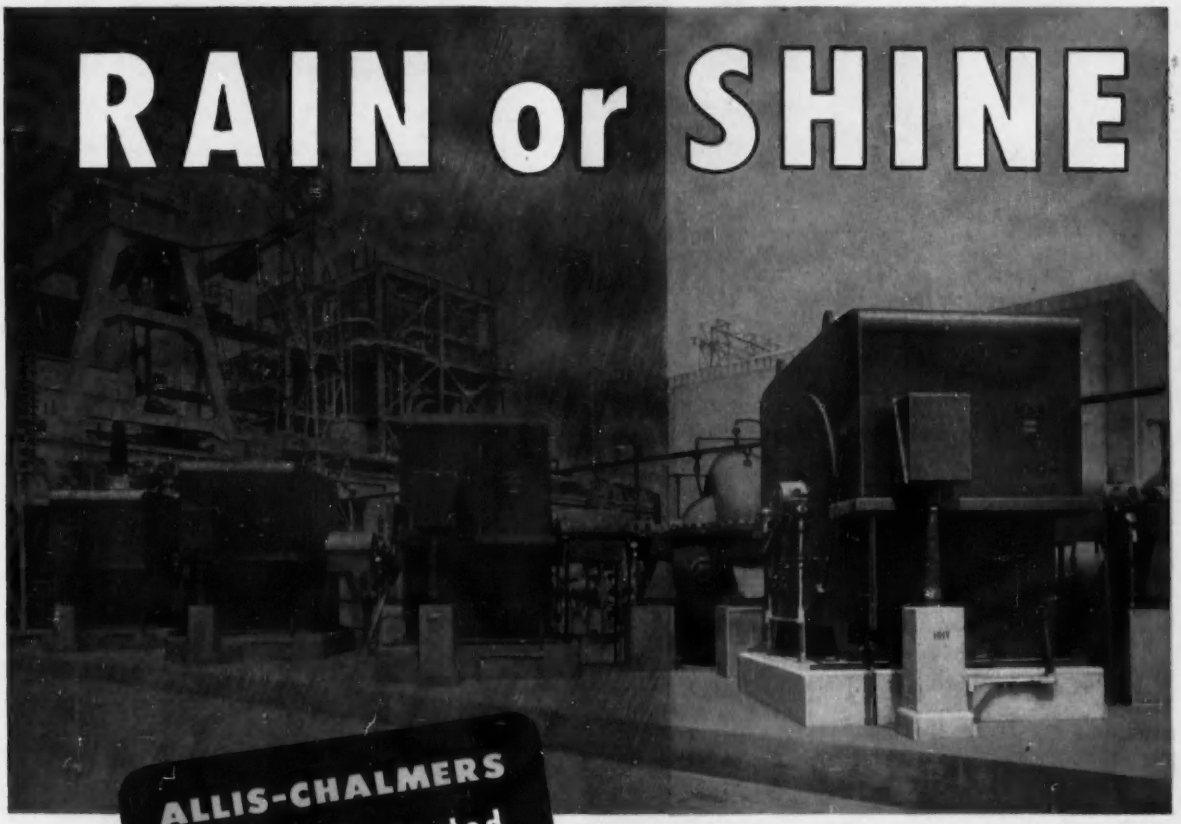
MOISTURE RESISTANCE (MAXIMUM VALUES)

Dielectric Constant and Power Factor of the insulation after immersion in water at 50 C.: Dielectric Constant, one day is 4.5; per cent gain, 1 to 14 days is 5.0; per cent gain, 7 to 14 days is 2.0; Power Factor, per cent, one day is 3.0; Stability Factor 40-80 volts/mil two weeks, per cent is .5.

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE & CABLE DEPT. • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



Low-cost outdoor installation plus dependable operation under all weather conditions

Economy plus reliability — regardless of weather conditions — was the combination demanded by Southern California Edison for the circulating water pump motors at the 250,000-kw Etiwanda Steam Station. And that's the combination delivered by the four Allis-Chalmers motors shown above.

Each of these modern weather-protected squirrel-cage motors is rated 900 hp, 4160 volts, 435 rpm. Smaller motors of similar design were supplied by A-C for the station's condensate booster pumps.

Proved by Special Tests

The weather-protected design has been tested under extreme conditions. Running at normal speed and voltage, motors of this type were deluged with water at rates up to 40 inches per hour — driven by winds up to 75 miles per hour. This was done repeatedly from all angles, but on inspection no moisture was detected on the windings. And other tests checked effectiveness in keeping out wind-driven fine sand — a serious threat at this west coast installation.

Movie and Bulletin Available

See how A-C test-proved these motors. Ask your A-C representative to show you the 12-minute movie *The Sky is the Roof*. Or write for Bulletin 05B7874. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4176

ALLIS-CHALMERS

NO. 4 IN A SERIES

a transmission line engineer ASKS—

"is there an insulator that will reduce the effects of air pollutions ?"

here is the ANSWER:

Yes, there is. It is the PINCO L-1925 "UNIVERSAL" INSULATOR which is specifically designed to reduce to a minimum, the damaging effects of fly ash and other air-borne industrial wastes which tend to decrease insulator efficiency and create a costly operational maintenance problem.

and 5 reasons WHY . . .

1. Leakage distance of 17" is approximately 50% greater than 10" suspension unit.
2. Outside petticoats shielded above by bell; below by hood.
3. Long, tapered hood is self-cleaning; acts as a splatter-baffle to clean the petticoats.
4. In strings, interior of hood is shielded by unit below—protected against contamination, thus reducing manual cleaning requirements to a minimum.
5. Standard 5¾" spacing permits replacement of conventional 10" suspension units without re-sagging.

Service records over a period of 20 YEARS

of continuous operation prove that thousands of these Pinco units have met their job requirements 100% in areas where excessive insulator contamination is an operational hazard. Certainly such a record of trouble-free performance proves that they're "right" where it counts . . . right on the job!

PINCO INSULATORS

★ The Porcelain Insulator Corporation ★ LIMA, NEW YORK

Sales Agents:
Joslyn Pacific Company
Offices in
Principal Cities

KUHLMAN 60 YEARS

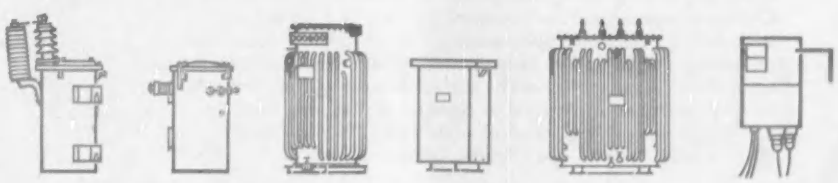
of leadership in the electrical industry

IN *1894, when Etna Kuhlman with a work force of two men founded Kuhlman Electric Company, the advantages of alternating current for the generation, transmission and distribution of electric energy had just been demonstrated. Few others had the vision to foresee that, because of this, the infant electrical industry stood on the threshold of an era of tremendous growth and that the transformer would be the key to the alternating current systems of the future.*

IN *the beginning, when the carbon arc light was first being used for street lighting, Kuhlman Electric developed a series street lighting transformer while engineers were proclaiming that it couldn't be done. Continuing to pioneer, Kuhlman was the first to take advantage of the better qualities of cold rolled oriented steel by developing the Bent Iron Core. This development precipitated a revolution in transformer design, and today most manufacturers utilize this steel to produce lighter, smaller, and more efficient transformers.*

KUHLMAN, *through the years, has introduced advanced design and new techniques to the art of transformer manufacturing. When fabrication by means of gas and electric welding was introduced by the metal industry, Kuhlman was one of the first to use welded transformer tanks and also first to use porcelain enameling paint on tanks for highly corrosive atmospheres. To insure safety and ease when installing pole-mounted transformers, Kuhlman engineers developed the knob type high-voltage bushing, which makes it possible to connect the transformer to the line without the use of tools. These accomplishments are illustrative of the many contributions that Kuhlman has made to the progress of the electrical industry, and have built for Kuhlman a reputation for progressive thinking and quality manufacturing.*

TODAY, *through constant research and ever expanding facilities, Kuhlman Electric Company continues its pioneering leadership in the electrical industry. For, although Kuhlman is now sixty years old, it has never lost the indomitable spirit and youthful vigor with which it began its rise to the position among the leaders that it holds today.*



KUHLMAN ELECTRIC COMPANY

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI

142

case history

use it anywhere

The versatility of Okolite rubber-insulated high voltage cables is demonstrated by these three typical installations. The first shows an installation of the Portland General Electric Company—two 1,800-ft. 13-kv rubber-insulated submarine cables being laid across the Willamette River. The next shows six 23-kv Okolite-Okoprene transformer leads at The Diamond Portland Cement Company. The bottom, four 390-ft. spans of three-conductor self-supporting Okolite-Okoprene cables at the Covington, Virginia plant of West Virginia Pulp and Paper Company.

.....underwater

.....in racks or conduit

.....on messenger

WHY THEY'RE SWITCHING TO OKOLITE rubber-insulated cables for use up to 35,000 volts

There is a distinct trend among industrials and public utilities toward Okolite rubber-insulated cables for high voltage use.

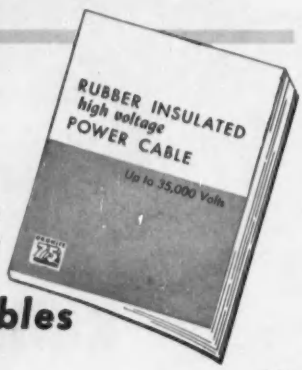
ADVANTAGES

1. Lighter and easier handling.
2. Eliminates sheath corrosion and fatigue.
3. Simplifies splicing and terminating.
4. Moisture does not affect the insulation.
5. No oil migration at high temperatures or elevations.
6. Flexibility simplifies installation.

APPLICATIONS

1. Transmission and distribution circuits.
2. Generator and transformer leads.
3. Vertical risers and shaft cables.
4. Submarine power cables.
5. Portable substation cables and test leads.
6. X-ray cables.

In the air, underground, underwater, in racks, ducts or conduits, Okolite-Okoprene rubber-insulated high voltage cables can be installed easily and permanently. The design and construction of this type of cable has been proved in all kinds of service for more than 25 years. The entire subject of rubber-insulated cable for high voltage application is covered in the new Okonite 128-page manual illustrated at right. Write for Bulletin WE-1075 on your letterhead to The Okonite Company, Passaic, New Jersey.

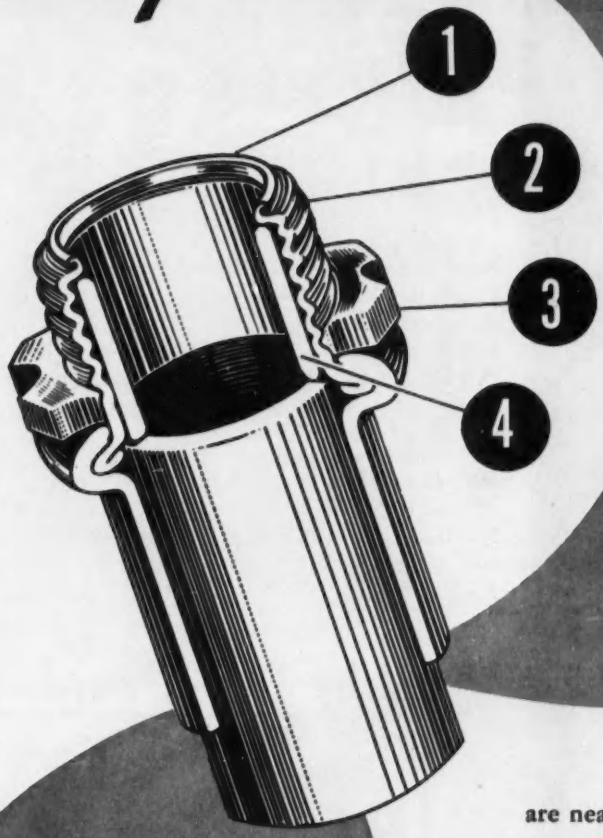


OKONITE SINCE 1878 *insulated cables*

1872

New B-M 21 E Connector

HAS 4 OUTSTANDING FEATURES



1 Smooth Rolled Edge Throat will not cut or scrape plastic insulation.

2 Full thread screws into all conduit fittings.

3 Nut screws down flush to shoulder for positive ground.

4 Internal sleeve same inside diameter as tubing insures smooth raceway for easy fishing.

All B-M Indenter Fittings are U. L. approved as Concretetight and for General Use. (File Card E 10863)

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

Duo-Guard Pushmatic . . . Now the STANDARD

Only Duo-Guard provides

→ 1. FOR BRANCH CIRCUITS

→ 2. FOR LAMP and APPLIANCE CORDS

Duo-Guard Pushmatic circuit breakers give you double protection because they have separate thermal and magnetic elements. The Duo-Guard principle assures you that lamp and appliance cords, as well as branch circuits, are guarded from thermal and electrical faults.

No other breaker—at any price—has both:

Thermal Element (bimetal strip) protects branch circuit wiring and insulation, from Electri-Center panelboard to receptacle or outlet, from any kind of thermal overloads . . . and prevents nuisance tripping.

Magnetic Element (multiple-turn solenoid) provides instantaneous protection for lamp and appliance cords, from receptacles or outlets to all properly connected electrical equipment. Also protects branch circuit wiring.

Now the standard BullDog breaker, Duo-Guard Pushmatic has all the famous BullDog exclusive features: simple-to-operate push-button control; day or night identification of "OFF" breaker; bolt-tight installation. No other breaker offers as much . . . yet many cost more.

Get the complete story on the world's most efficient circuit breaker. Write, today, for new, free Bulletin PM-365. BullDog Electric Products Company, Dept. EW-123, Detroit 32, Michigan.

©BEPCO

Why Duo-Guard Pushmatics Provide Double Protection

BULLDOG

THOROUGHBRED IN ELECTRICAL EQUIPMENT

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES

Coast Electric & Manufacturing Company
1733 N. E. Seventh Ave.—Tel. TUxedo 5191
Portland 12, Oregon

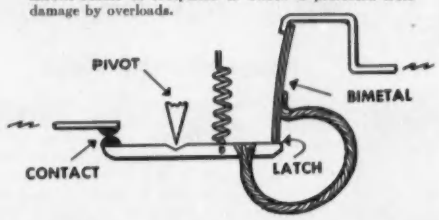
BullDog Breaker
double protection

DUO-GUARD

Duo-Guard Pushmatics are available in 15-, 20-, 30-, 40- and 50-ampere ratings: 1-pole, 120 V., A.C., Listed by Underwriters' Laboratories, Inc.

Simplified diagram of Thermal Element

As bimetal is heated by excess electric current, it bends and releases latch. Spring snaps latch upward, breaking contact. Branch circuit wiring, including insulation, from Electri-Center to receptacle or outlet is protected from damage by overloads.



Simplified diagram of Magnetic Element

Wound wire coil (solenoid) is energized by current. When short occurs, coil *instantly* activates metal plunger which breaks contact. BOTH BRANCH CIRCUIT WIRING AND LAMP AND APPLIANCE CORDS ARE PROTECTED FROM ELECTRICAL OVERLOADS AND SHORTS.

ELECTRIC PRODUCTS COMPANY

Safety Switchboard Company
910-89th Ave.—Tel. LOckhaven 9-7001
Oakland 21, California

BullDog Electric Products of Los Angeles
2885 E. Washington Blvd.—Tel. ANgelus 9-8101
Los Angeles 23, California

Young Electric & Manufacturing Company
2134 Curtis Street—Tel. AComa 4841
Denver 2, Colorado

Twist-Lock
TRADE-MARK
ELECTRICAL
CONNECTORS
No. 7688
No. 7542
FIRST AND STILL THE FINEST
PLUG IN-- TWIST
Rugged
LOCKED
AND IT'S
For Greater CONVENIENCE, SAFETY and EFFICIENCY in the Operation of Motor-driven Tools or Portable Electrical Apparatus.
NEVER DISCONNECTS ACCIDENTALLY
The Hubbell Twist-Lock locking action insures a positive contact that will not come loose accidentally regardless of rough treatment, heavy vibration, or other conditions that might cause down-time and production loss. Twist-Lock is made in two-wire, three-wire and four-wire sizes. The three and four-wire sizes are available grounded and not grounded.
For complete information, write Harvey Hubbell Inc., Dept. R-1, Bridgeport, Conn.
Here's the answer to many of your wiring problems. Write for this Twist-Lock booklet today!
THESE FEATURES MAKE ALL THE DIFFERENCE
• Properly polarized for protection against fire and shock.
• Three and four-wire types available grounded to metal cover on request.
• All exposed metal parts plated to resist corrosion.
• Precision-engineered for positive locking action.
• Sturdy cord grips eliminate wire "pull out."
Highest Grade
HEAVY DUTY
WIRING HUBBELL DEVICES
HARVEY HUBBELL, INC.
BRIDGEPORT, CONN.
2HH54

LETTERS TO THE EDITOR

Yes, Spread the Word

To the Editor:

In your November editorial, "Wiring Reaches Its Limit," you have succeeded in pointing out the harmful effects of inadequate wiring upon the electrical industry itself. As there still are contractors and retail appliance dealers who are not aware of the harm inadequate wiring can do them, we would appreciate receiving your permission to reprint your editorial in our Shasta Division *Dealer Bulletin*, a sample of which is enclosed.

This *Dealer Bulletin* is mailed to appliance dealers and contractors throughout the Shasta Division of the Pacific Gas and Electric Co.

H. S. Newins
Dealer Representative
Pacific Gas and Electric Co.
Red Bluff, Calif.

Good "Want Ad"

To the Editor:

Sid Caldwell and I wish to thank you for the very fine "Want Ad" that appeared in your November issue of Electrical West, p 92, entitled "Wanted—A 7.2-Kv Transformer Without Taps, at a price differential." Your title was certainly an "eye catcher" and I only hope that "industry" gives the subject matter some favorable thinking.

We have been assured that the need for "no taps" will be given consideration at the next meeting of the EEI-NEMA joint committee on standards for distribution transformers. We have already contacted E. V. Sayles, chairman, and have discussed the matter with H. E. Jung. Also, the several manufacturers' representatives have advised their home offices of our desires . . .

E. A. Paine
Assistant Superintendent of Distribution
Portland General Electric Co.

Subscribe to Premise

To the Editor:

I read for the second time the article "A Letter to Distribution Engineers," which appeared in the November issue of Electrical West. I, myself, have always supported the theory of strong, efficient distribution systems and needless to say therefore I thoroughly subscribe to Walter Heston's premise.

A. S. Cummins
President
California Oregon Power Co.
Medford, Ore.

To the Editor:

. . . Mr. Heston's article is good and we have been devoting considerable time and money to accomplishing the objectives he outlines . . .

J. B. Black
President
Pacific Gas and Electric Co.
San Francisco, Calif.

DETERIORATED OIL
CLARIFIED OIL
Adsorption:
adhesion of gases or dissolved substances or liquids to the surface of solid bodies with which they are in contact.

EXPERIMENT in adsorption: add tapes made with colloidal carbon to deteriorated oil; stir. Note that Carbon Black *adsorbs* impurities. Clear oil results. In Type CB Cable these carbon-black tapes purify oil by the same process.

"Black Magic" makes this cable last longer

Heat and electrical stress . . . heat and electrical stress . . . keep it up long enough and insulating oil in ordinary paper cable breaks down. The cable may have to be replaced.

ANACONDA Type CB* (Carbon Black) Power Cable is different. Special carbon-black tapes continually purify and stabilize the insulating oil . . . keep oxidation products outside the dielectric field. They stop ionization discharges. "Black magic" insures added life for this superior cable.

For greatly extended sheath life of ANACONDA Type CB Cable, specify ANACONDA F-3** alloy. This superior alloy-lead sheath won't age-harden . . . resists slow-bending fatigue, creep, burst and abrasion. Cable joint sleeves also are available in this same alloy. They all offer higher tensile strength, a 50% higher bursting strength than copper-lead, lower creep rate and similar increased resistance to bending fatigue and vibration.

Ask your Anaconda Representative to show you how this outstanding cable can help gi[ve] your distribution system maximum service life and economy. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 5332

*CB — Carbon Black (U. S. Patents 2,102,129, 2,405,853) Reg. U. S. Pat. Off.

**F-3—Arsenic-Lead Alloy (U. S. Patents 2,300,788, 2,375,755, 2,504,600 and 2,570,501) Reg. U. S. Pat. Off.

ANACONDA®

Service and overhead distribution cables, bare and weatherproof, including ACSR • signal, control and communication cable • portable cords and cables • network cables • airport and series lighting cables • mine cables • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories.

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

Concentric winding as applied to High Voltage Transformer Design and Manufacture

By C. M. Lovell
Vice President and
Chief Engineer
Moloney Electric Co.

Practically every transformer built by Moloney has used the concentric type core winding. The substantial success of the Moloney Electric Company has been established by it. This applies over the entire range of sizes and voltage classes.

For voltage classes 69 Kv and below, the concentric layer type of winding has been used with marked success, in past years. For voltage classes up to and including 230 Kv, 60,000 Kva, concentric type with disc or pancake coils for the high voltage windings have successfully been used. This type of construction has very good performance characteristics, but with the larger sizes and higher voltage classes being specified today, physical size has become a critical factor because of existing clearance limitations imposed by all transportation routes.

We, here at Moloney, when confronted with the necessity of building larger sizes and in higher voltage classes, concluded logically that we could still build a concentric type transformer, by using the concentric layer type of winding for these high voltages. In accomplishing this we have retained the favorable operating characteristics of this type of construction, while at the same time reducing overall size. Thus we have been able to increase Kv and Kva ratings greatly while still remaining well within the physical limitations existing transportation facilities imposed upon us.

As its name implies, the concentric layer type of winding is a winding of several layers positioned outside of the low voltage winding, or the low voltage and tertiary windings (Fig. 1).

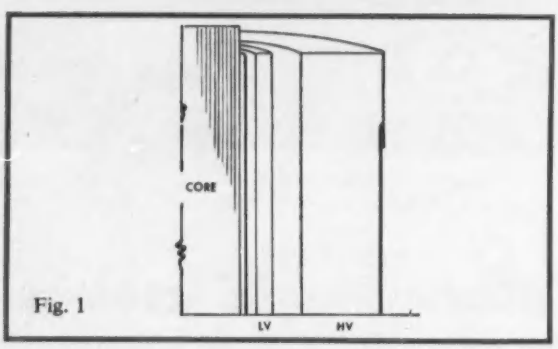


Fig. 1

The first layer is wound directly on a paper cylinder. This cylinder is solid in the space occupied by the conductors and is untreated at the ends.

The conductor consists of several strands of enameled rectangular copper wire. These are transposed continuously by a special machine, and the finished conductor has the strength of a solid wire the same area as the several strands (Fig. 2). This conductor is covered with paper by this same machine, the number and thickness of the paper depends on the voltage which is being applied to the conductor.

Because of the size and weight involved, a special winding lathe is used to wind the concentric layer coils. This machine is specially designed to wind the coil tightly, in both the axial and radial directions. As the conductor is wound on

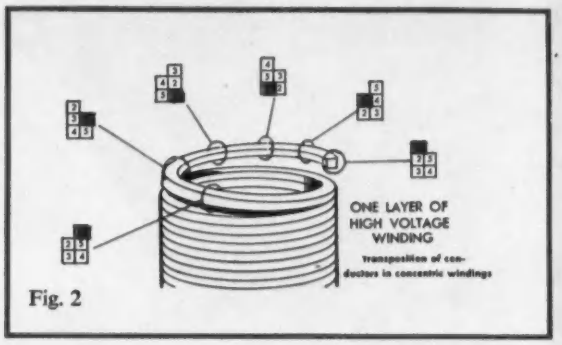


Fig. 2

the paper tube it is pressed down and against the preceding turn by a clamp which travels along the tube.

After the first layer is finished, axial spacer strips which form an oil duct are placed over the layer. Then, many layers of thin paper are applied to form an untreated tube of the size desired. To minimize shrinking in the drying process, tight application of the paper laminations is necessary.

Several layers are thus wound, the number being determined by the voltage of the winding. Each tube has an extension beyond the winding space of the layer. Each layer is also shorter than the preceding one. This stepping back of the winding space is determined by the voltage class and the number of layers. A smooth voltage distribution is obtained in this way.

Over the last or outside layer is wound a paper tube and oil ducts, and finally a shield is built over this tube (Fig. 3). This shield is connected to the line turn and has the effect of producing a nearly uniform impulse voltage distribution.

On completion of the winding the tubes extending beyond the wire space are flanged outward as shown.

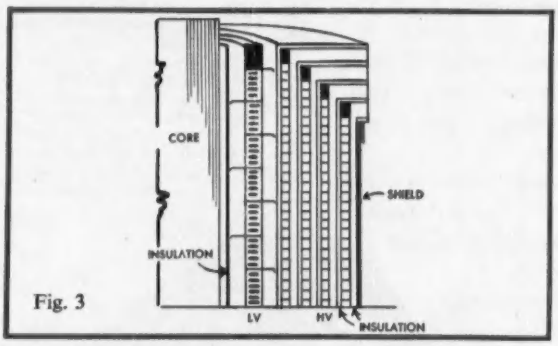


Fig. 3

The concentric layer winding is applied to grounded neutral classes of transformers. The neutral is in the layer next to the low voltage winding. Thus a much smaller space between the low voltage coil and the first layer of the high voltage can be used. This makes for low reactance inherently.

Since the windings of the concentric type of transformer are axially balanced, the stress under short circuit is negligible in the vertical direction. The stress is practically all in a radial direction and since the windings are already circular and well braced, no displacement can occur. This type of winding has been tested under the most severe short circuit conditions with no damage (Fig. 4).

MEBS-47

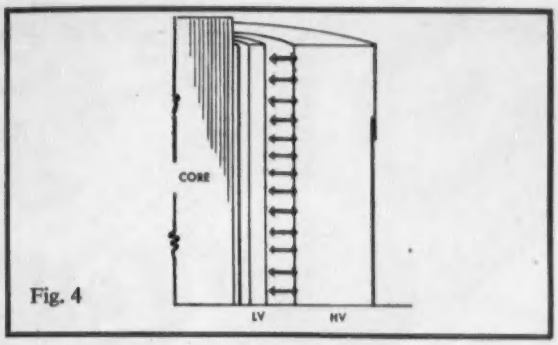


Fig. 4

The optimum impulse voltage distribution curve would be a straight line. The concentric layer winding with its shield will give almost the theoretical distribution curve. Small cusps will appear at each layer end and these require additional insulation which is easily applied on the transposed conductor (Fig. 5).

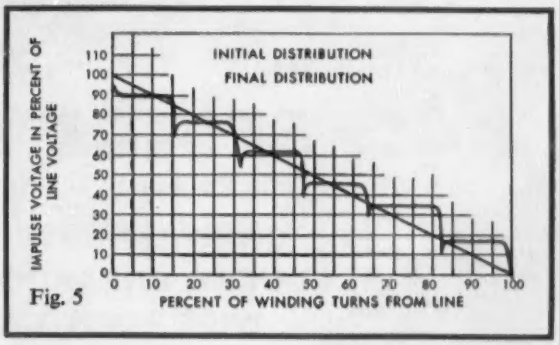


Fig. 5

Many large transformers are now supplied with forced-oil cooling. The concentric layer winding lends itself admirably to this method of cooling. The ducts next to the winding are all vertical and it is quite simple to distribute properly the oil flow to all windings and the core (Fig. 6).

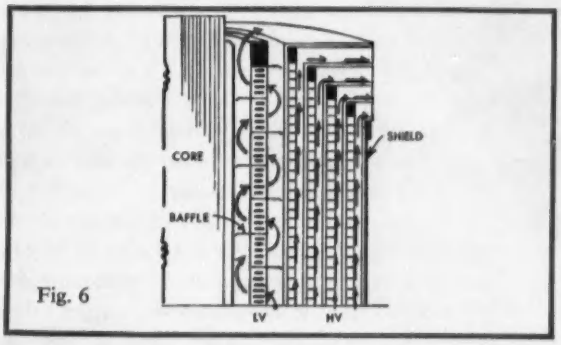


Fig. 6

Because of the smaller space between windings, the coils can be shorter, have a greater radial build and still obtain the required reactance. Savings in critical winding space reflect favorably in the overall size, weight and oil required. It permits construction of the largest transformers and it is possible to ship them in their own one piece tanks. This favorable size and weight factor, makes assembly at the site much easier.

MOLONEY ELECTRIC CO.
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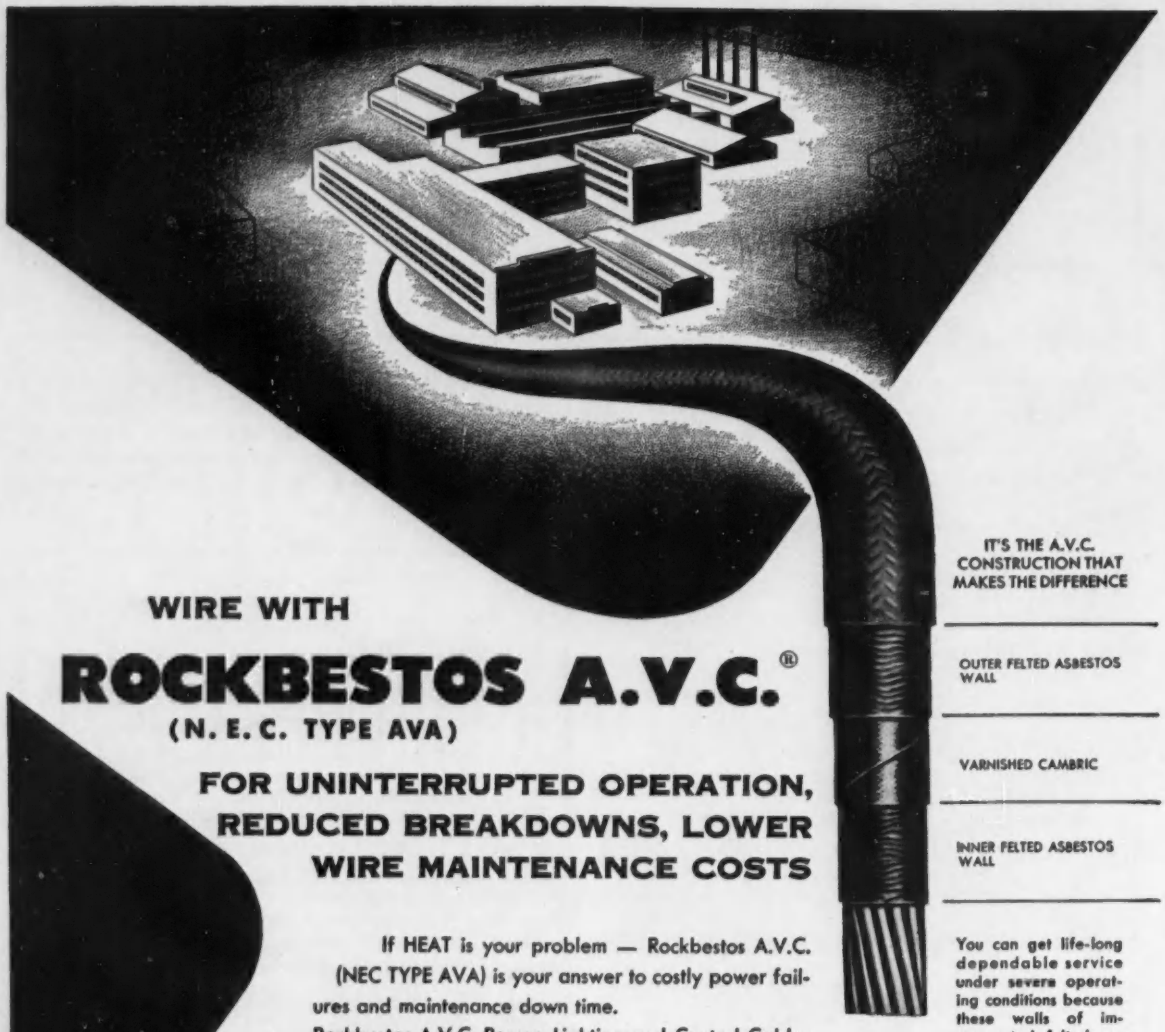
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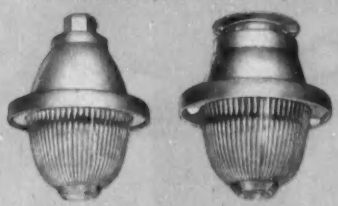

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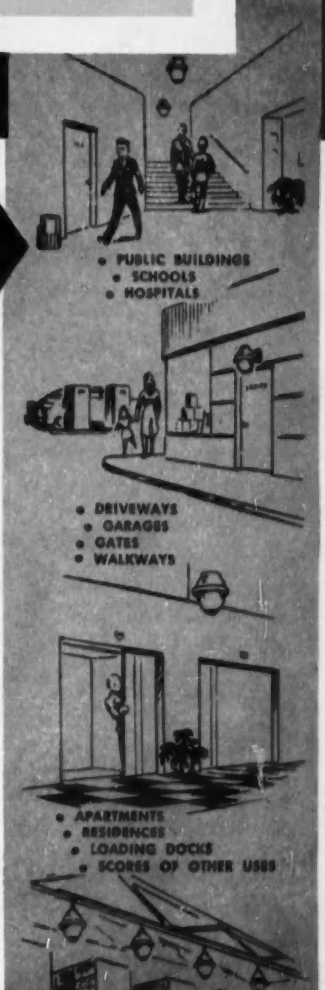

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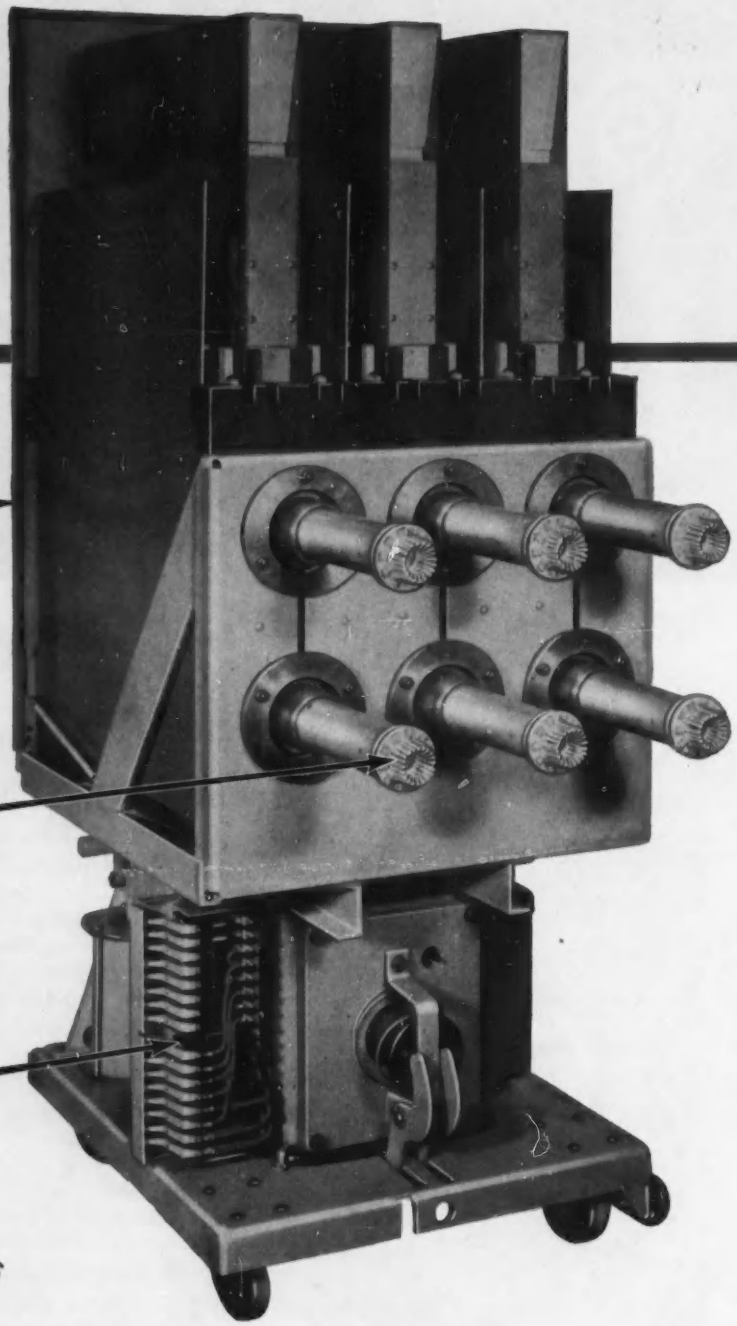

Safety first! Steel panel in front completely seals off high voltage members

Primary contact fingers are on bushing of movable portion ... easy, safe to inspect

Secondary disconnects are direct-connected to auxiliary switches- eliminating wiring

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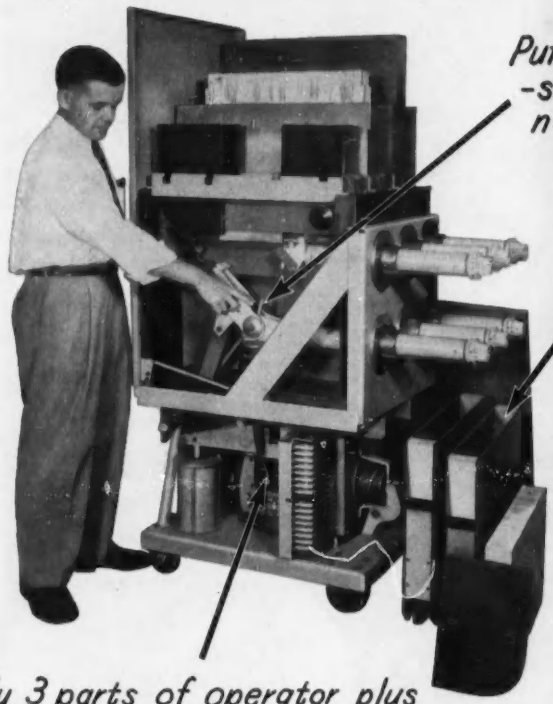
engineering notes on

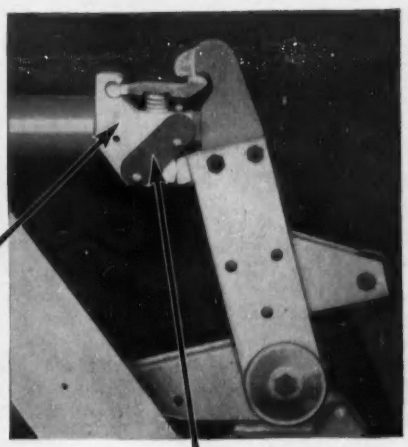
New 13.8-Kv Breaker



Puffer at ground potential -separately mounted- not on moving part

Each part of arc chute assembly is separately movable and can be conveniently handled by one man

Only 3 parts of operator plus armature move on closing operation; latch and trip-free link plus 3 parts of operator move during opening



Contacts are blow-on type. Magnetic field is arranged so that contact pressure increases as current increases

Access to contacts may be made by removing this insulated cover

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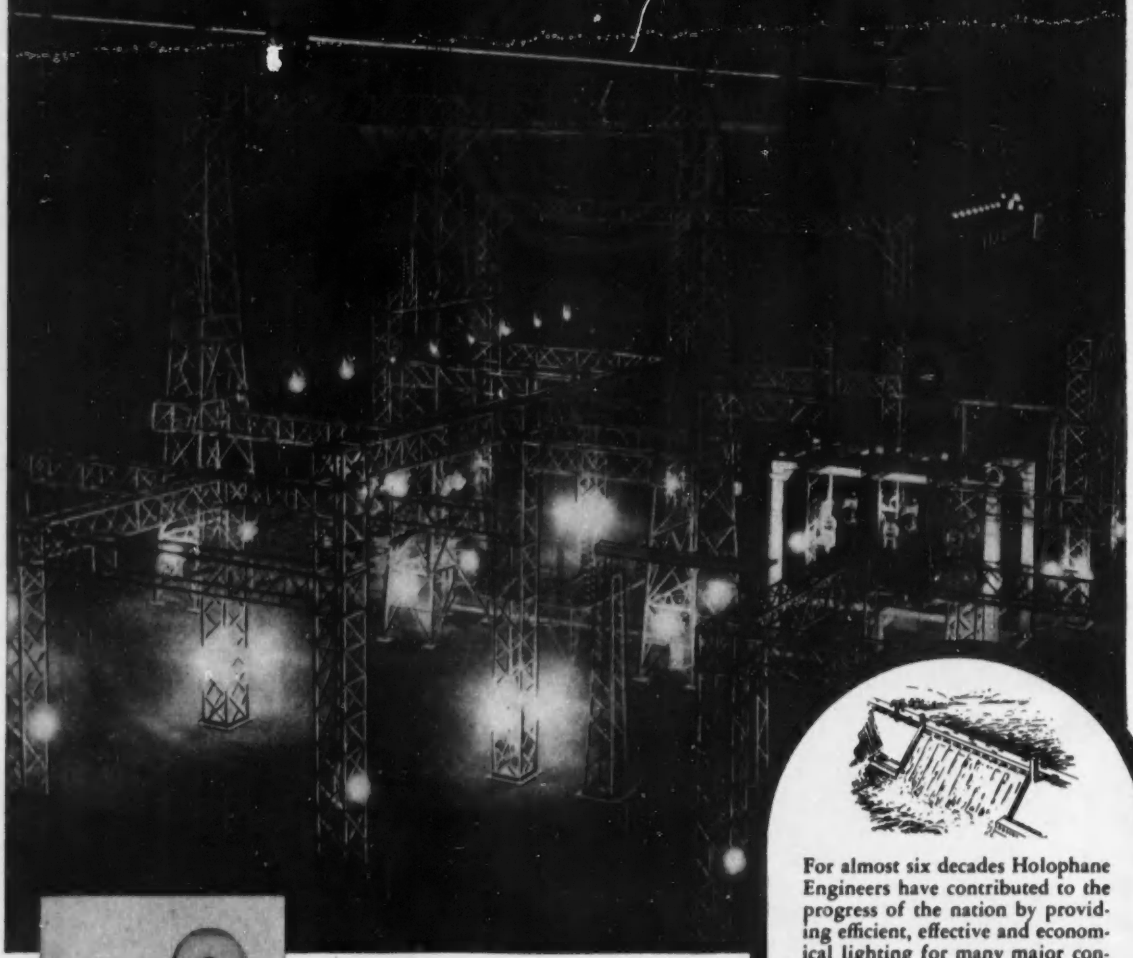
HOLOPHANE LIGHTS *the Biggest Switchyard in the World*



Typical Holophane substation unit (Nos. 043386-043776). Write for complete engineering and installation data.

For almost six decades Holophane Engineers have contributed to the progress of the nation by providing efficient, effective and economical lighting for many major construction projects . . . Shown is a view of Grand Coulee Dam, looking through the "Right Switchyard", regarded as one of the largest in the world. Here 299 Holophane substation lighting units are installed . . . Another indication of the steadfast acceptance of the basic principles for outdoor substation lighting as developed by Holophane . . . You are invited to consult Holophane Engineers on any lighting problem—without obligation, of course . . .

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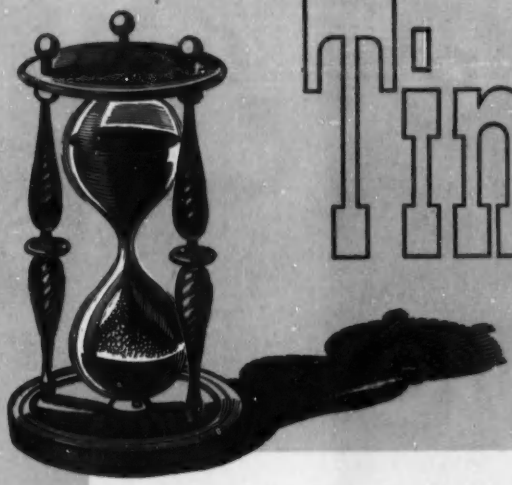

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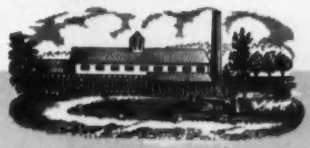
Time is the measure of all things. Few of man's inventions can stand its merciless judgment. Yet Kerite for 100 years has thrived and spread and gained renown. Time, indeed, gives Kerite its unqualified recommendation.

The Value And Service Life Of A Product Can Be No Greater Than The Integrity And Craftsmanship Of Its Maker.



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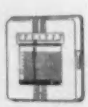

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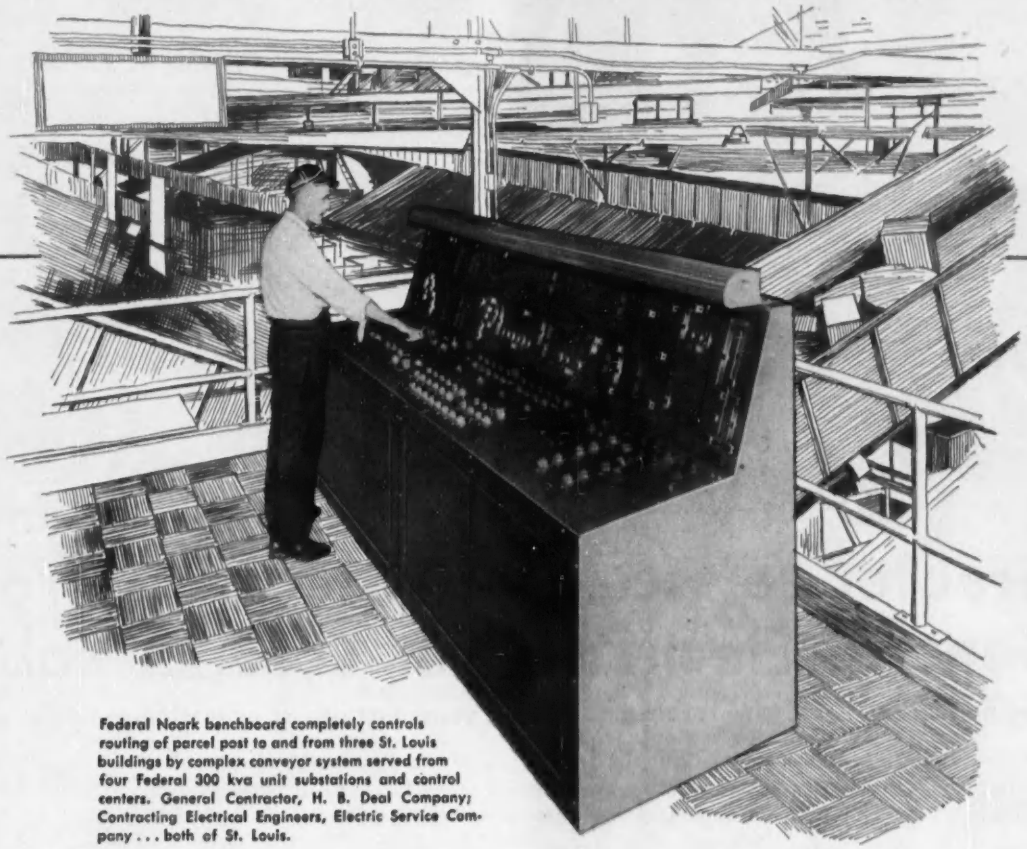

Federal Noark benchboard completely controls routing of parcel post to and from three St. Louis buildings by complex conveyor system served from four Federal 300 kva unit substations and control centers. General Contractor, H. B. Deal Company; Contracting Electrical Engineers, Electric Service Company . . . both of St. Louis.

PARCEL POST in St. Louis is now rapidly moved by the Terminal Railroad Association's new conveyor system from Union Station, a new Terminal building, and the Post Office. This system, the most elaborate of its kind in the country, is powered from four Federal Noark Unit Substations and controlled by a specially-designed Federal Noark indicating bench board.

The unit substations are 300 kva, 4180/480 volt, 3-phase. Each has a three-position fused primary selector switch so that either of two primary sources can be selected. Each station has a main secondary breaker feeding a close-coupled control center. Secondaries from all units can be tied together through Federal Noark Bus Duct.

The benchboard completely outlines the entire system and can select any number of conveyor arrangements which are instantly indicated by illuminated routings shown in miniature.

Here is another example of Federal's ability to handle your distribution or control problems. Remember, Federal Noark has the engineering skill and manufacturing facilities to provide exactly the right equipment for your requirements.

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Federal Noark products: Stab-lok Circuit Breakers, Motor Controls, Safety Switches, Service Equipment, Industrial Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct — **Pacific Electric Manufacturing Corporation products:** High voltage circuit breakers and power switches ★ Sales offices in principal cities.

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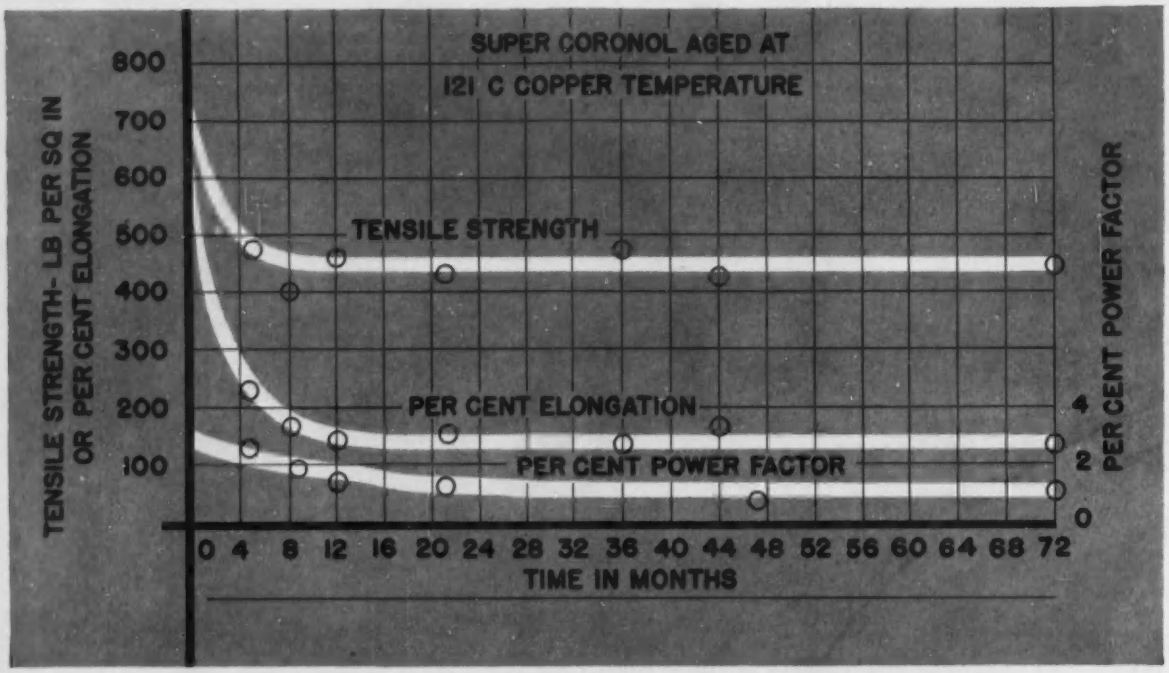

Fig. I: Physical and electrical properties of G-E Super Coronol cable as demonstrated by long-time tests at 121 C copper temperature.

Greater service-life expectancy from General Electric Super Coronol cable

Aging tests at 121 C give results equal to 72 years test-life at operating temperature

General Electric Super Coronol* cable has been tested under load for six years at a continuous copper temperature of 121 C. Both physical and electrical properties have been stable since the 20th month. (See Fig. I.) Following the general rule that insulation life is doubled for every 8 to 10 C decrease in temperature, these data at 121 C indicate from *72 to 135 years of test-life* at the rated temperature of 85 C.

These tests, supplemented by many others, demonstrate the justification for basing the ratings of all G-E Super Coronol power cables, for service up to and including 8000 volts, on a permissible maximum copper temperature of 85 C, and for permitting emergency overload temperatures. (See Fig. II.) Super Coronol cables are available as single-conductor cables (shielded and unshielded), preassembled aerial cables, submarine cables, and power cables. For further information on Super Coronol cables and other General Electric wire and cable products and systems, consult your G-E cable specialist, or write Section W113-125, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Fig. II: Allowable Operating Temperatures Super Coronol-Geoprene Cable

Voltage Rating	Normal Loading	Emergency Overloading	Short Circuit Loading
0-1000	85 C	115 C	150 C
1001-5000	85 C	102 C	145 C
5001-8000	85 C	100 C	140 C
8001-15000	80 C	90 C	120 C

*Registered Trade-mark General Electric Company

You can put your confidence in—

GENERAL ELECTRIC

Don't Scatter Your Motor Starters • Use A-B Multi-Unit Control Centers

Group your motor starters together in Allen-Bradley Bulletin 798 Multi-Unit Control Centers and enjoy these five big benefits:

1—Centralized electrical maintenance
2—Increased safety to all personnel
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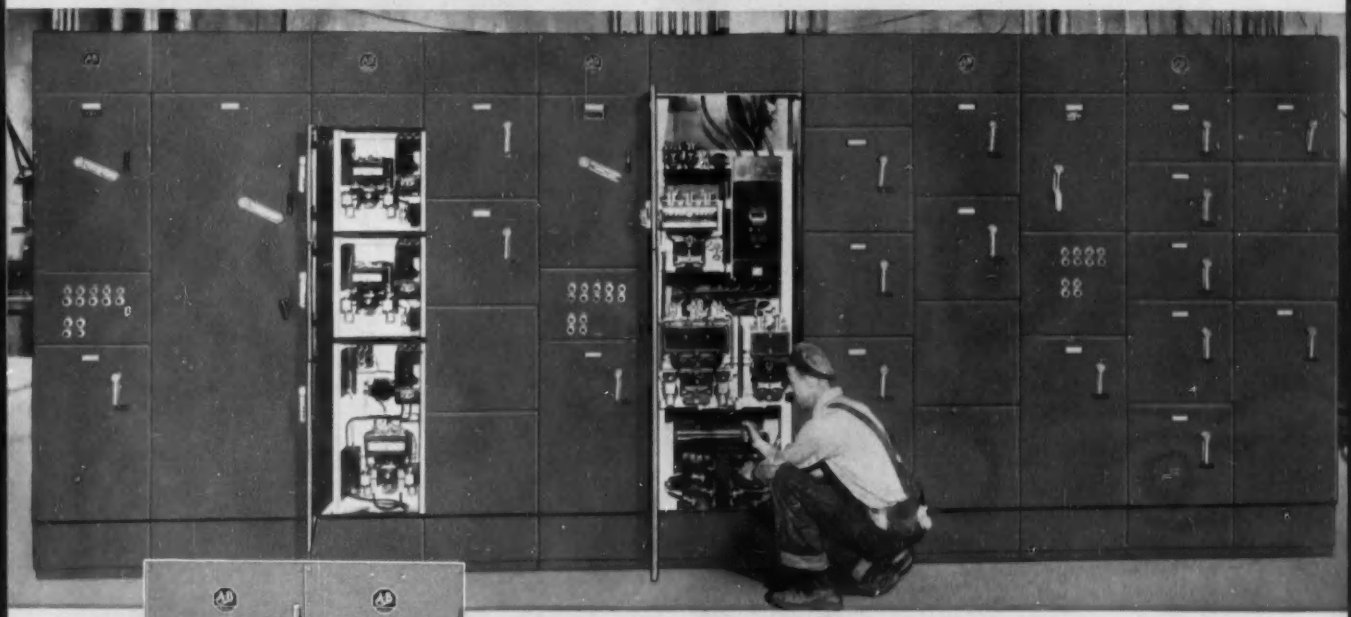
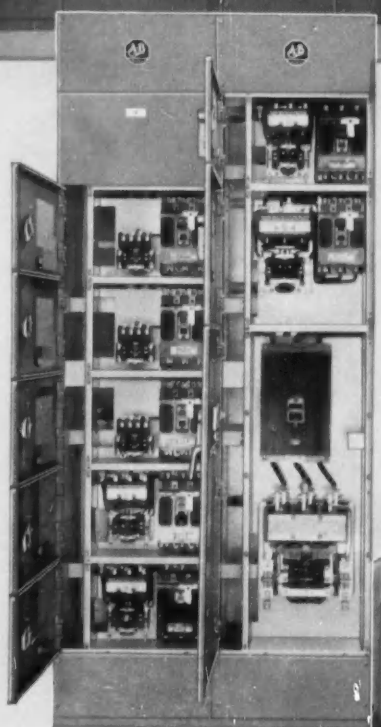
4—Reduced need for special starter enclosures
5—Greater flexibility in making plant changes

The whole story is told in Bulletin 798. Please write for copy.





2-Section Allen-Bradley Control Center with Sizes 1, 2, 3, & 4 across-the-line starters . . . all with ITE circuit breakers.

Allen-Bradley Multi-Unit Control Centers Assure Continuous Production at Basic Refractories

In Maple Grove, Ohio, Basic Refractories, Inc., produces a large tonnage of refractory materials, using 390-foot, motor driven kilns with 200 hp fans. It is a continuous process and all motor controls are centralized in 8 large A-B Multi-Unit Control Centers, doing away with scattered controls requiring dust-tight enclosures.

Since Allen-Bradley double break, silver alloy contacts require no filing, cleaning, or dressing, the need for inspection is practically eliminated.

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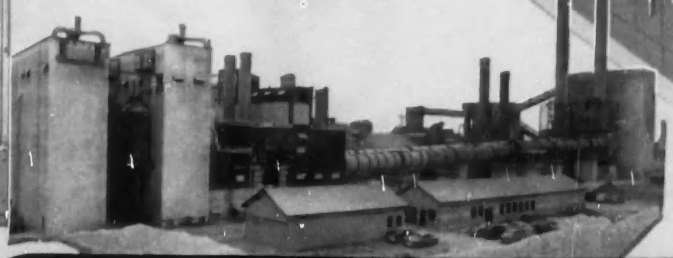

8-Section A-B Control Center for grinding and screening controls.

A-B Quality

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BULLETIN 798 MULTI-UNIT CONTROLS
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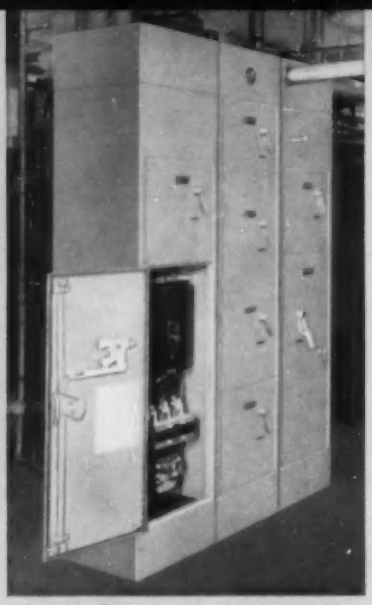
I-54-M



A 3-section, 8-unit, Allen-Bradley Multi-Unit Control Center operating a large electric furnace. One door open to show circuit breaker.

Bulletin 798 Multi-Unit Control Centers

NEATER • SAFER • INTERCHANGEABLE • ADAPTABLE

• There is a strong trend in modern plant layouts to concentrate motor controls in "control centers" like Allen-Bradley Bulletin 798 Multi-Unit Controls.

Bringing your motor controls together in one spot makes for more systematic inspection. It also prevents unauthorized changes in fuses, circuit breakers, and timing relay adjustments. It slicks up your plant and gives it a more modern, streamlined appearance. In fact, it often saves you the cost of providing special enclosures because control centers can be installed away from processes that are dusty, wet, or hazardous.

Let us send you an interesting, illustrated, 28-page booklet on Bulletin 798 Multi-Unit Controls. It shows the flexibility and adaptability of these versatile control units.

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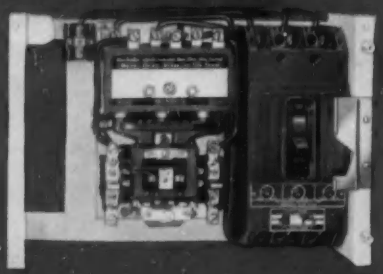
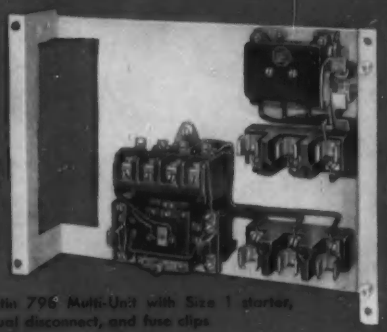
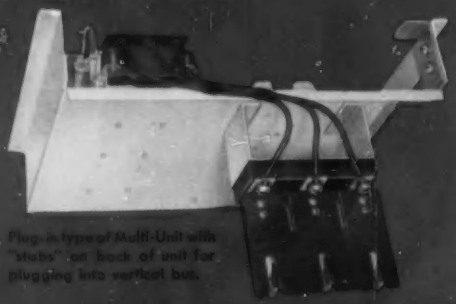


Bulletin 798 Multi-Unit with Size 3 solenoid starter and circuit breaker.



Bulletin 796 Multi-Unit with Size 1 starter, manual disconnect, and fuse clips.

A-B Quality



Plug-in type of Multi-Unit with "stabs" on back of unit for plugging into vertical bus.

Fixed-connection type of Multi-Unit with permanently wired connection to bus.

Motor starters are removable as a unit, making it easy to adapt control center to changes in plant layout.

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Get into the heating business... and get repeat business !

USKON ceiling heating panels are quickly, easily applied to the ceiling. Minimum of time and bother.

When homeowner finishes his expansion attic or builds a game room, he orders more USKON panels from you. *Repeat* business!

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USKON sheet panels are quickly and easily applied on the ceiling by any electrical contractor. No extensive wiring or alterations needed. The panels are *applied*, not embedded in the ceiling. A minimum of time and trouble for you. Costs stay at rock-bottom.

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Uskon is the heating system every homeowner wants. No radiators, no ducts, no hauling of ashes, no soot, no dirt. Heat goes on or off with just a flick of a switch or thermostat. Fits in with any decorative scheme, can be painted over with any ordinary flat paint.

USKON is a product of United States Rubber Company. It has been tried and proven for many years with complete success in homes, apartments, offices, commercial and industrial buildings, bathrooms, sun porches, game rooms, garages, basements, motels, summer cottages. It is approved by Underwriters' Laboratories, Inc.

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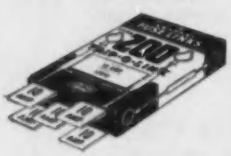
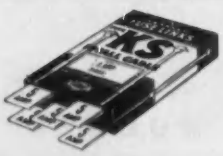
1. **True mechanical interchangeability because button terminals are threaded**
2. **Greater accuracy and dependability**
3. **Packages are color-coded (silver for Type T—gold for Type K) to assure fool-proof identification and save time on the job**
4. **Easy-to-use, "pull-out" package**

or Specialized

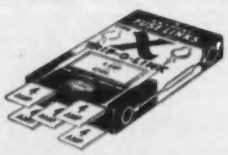
KEARNEY Type 200
Specially made for troublesome circuits that are subject to long-time overloads and surges. Overloads up to 150% can be carried for as long as one hour without damage to fuse link or cutout.



KEARNEY Type KS
Specially designed to protect and still keep outages at a minimum on circuits subject to switching and lightning surges. KS overload capacity is identical with Type 200, but surge capacity is twice as great.



KEARNEY Type X
A specialist at keeping transformers in service during heavy overloads and surges . . . yet clears the fault before damage range is reached. Opens 230% of rated current within five minutes.



KEARNEY Type QA
The QA link is designed to open at a lower percentage of rated current, and therefore will fuse more rapidly than fuse links of the same ampere rating which have been designed to open 230% of rated load within five minutes.

FOR BETTER CONSTRUCTION—FOR SAFER MAINTENANCE

THAT SAVES YOU MOST..

KEARNEY

Gives You a Complete Choice

Whatever your fuse link needs . . . standard or specialized . . . you can be sure of finding exactly the protection you need in the complete KEARNEY line. All KEARNEY links are color-coded to save your crews time and trouble, packaged for easy handling, and made with the accuracy you need for top protection. Time-current curves and charts are available to help you work out your coordination problems.

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PRODUCT NEWS

Regulator Jack Speeds Inspection

(1) Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

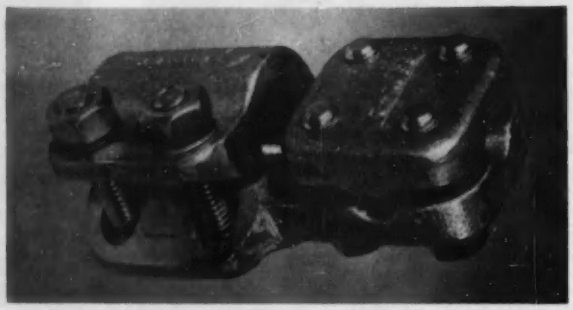
This portable hydraulic jack was designed to facilitate on-the-job inspection of the manufacturer's single-phase, step-type feeder voltage regulators (types DFR and JFR). Using a pair of the jacks, one man can sufficiently untank the regulator for inspection without moving it out of the station superstructure, it is stated.

Setup time for the jacks and untanking for inspection requires less than 20 minutes because only cover and control mounting bolts need to be removed to untank as an assembly, according to the manufacturer. The jack can be handled by one man and can be carried in the trunk of a car.

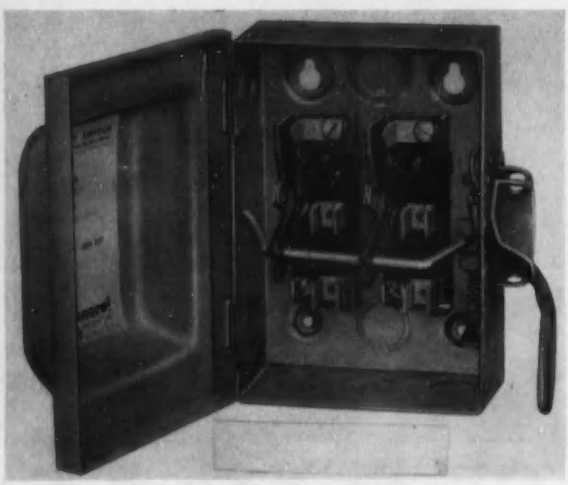
Designed to New Standards

(2) Burndy Engineering Co. Inc., Norwalk, Conn.

This stud-connector type NDR was designed in accordance with latest EEI-NEMA standards for distribution transformers, overhead type. According to the manufacturer, the single size of this range-taking stud-connector can be stocked for all transformers shipped without connectors. It is for use with high-voltage bushings of transformers 29.9 kv to 67 kv, 25 kva to 500 kva, single phase and three phase, which will be supplied with 1⅛-in. studs, 12 threads to the inch, as specified in the new standards.



The NDR connector accommodates a cable range from No. 6 solid to No. 4/0 stranded copper, using two different size grooves on one surface of the cap. Two perpendicular grooves of the same size in the body permit either horizontal or vertical take-off. Hardware required to assemble the cable to the connector has been reduced. The cable portion of the connector has tapped holes and therefore no nuts are required, the manufacturer states.



Industrial Safety Switch

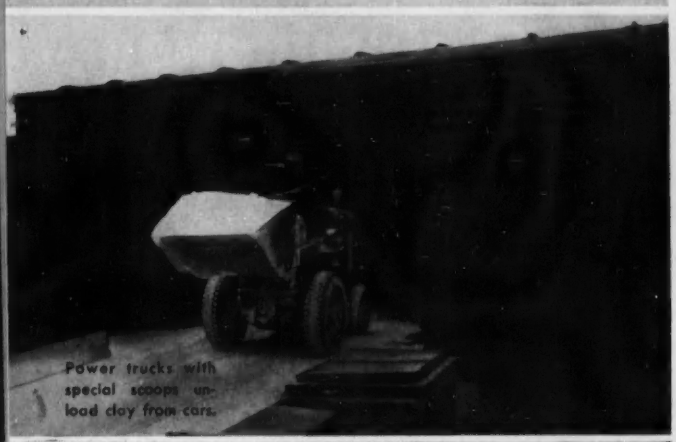
(3) General Switch Corp., 45 Roebling St., Brooklyn 11, N. Y.

A newly designed type A 30-amp enclosed safety switch is claimed to give smoother action and longer life. It has special bronze alloy fuse clips with reinforcing steel springs, breakjaw design said to assure correct blade alignment and more compact enclosure with ample wiring room.

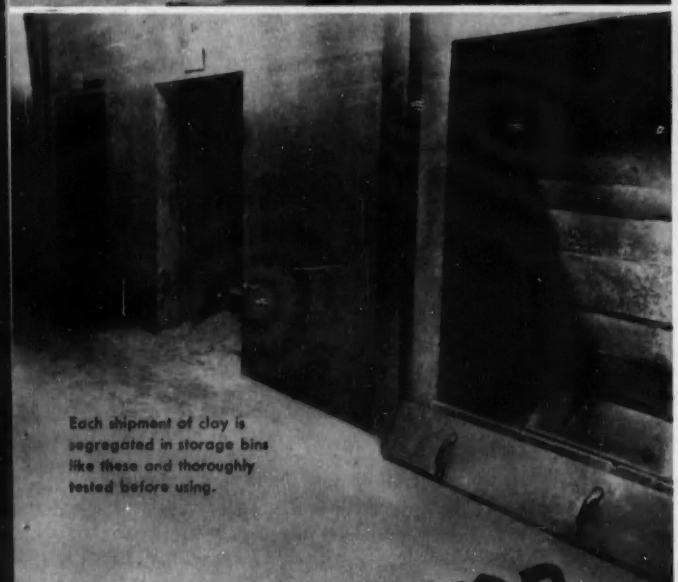
To simplify and speed maintenance and inspection, the interlock cover may be defeated to allow the door to be opened when switch is on. The defeating mechanism also permits switch to be thrown when door is open. No special tools or keys are required.

The switch meets federal specifications WS-865 and has a harder, more attractive finish, the manufacturer states.

The world's finest ceramic raw materials come from the states shown in color. Victor uses them exclusively.



Power trucks with special scoops unload clay from cars.



Each shipment of clay is segregated in storage bins like these and thoroughly tested before using.

Specify **VICTOR**
PURIFIED PORCELAIN
INSULATORS

Another Reason Why—

VICTOR Makes Better Insulators

WE USE AMERICAN CLAY, FLINT AND FELDSPAR EXCLUSIVELY!

BETTER INSULATORS begin with better materials. Victor was the *first* to recognize the superior qualities of *American* clays and the advantages of closer control over sources of supply. That's why Victor *Purified* Porcelain insulators have greatest uniformity in mechanical and electrical strength values. For the whole story, send for our free Booklet, "The Story of Victor and Purified Porcelain."

VICTOR NO. 9
LOW VOLTAGE
PINTYPE

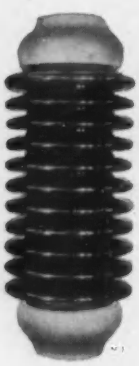
VICTOR INSULATORS, INC., VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions
Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain

PROBLEM: Industrial Contamination

LAPP LINE POST

"All-time champion" among transmission insulators in point of service dependability at duty up to 69 kv. Its record, both on new construction and after reinsulation of lines to higher voltages, has been built on ability of Line Post to avoid leakage flashover, to withstand lightning arcover and mechanical attack, its inherent freedom from puncture and cracking.



LAPP STATION POST

In addition to the superior electrical and mechanical characteristics inherent in Lapp Post design, Station Posts also possess extra rigidity. Cap and base are externally attached for large-area low-intensity compression loading of porcelain, as contrasted to small-area, high-intensity loading of nested porcelain and metal parts in conventional pin-cap switch insulators.

LAPP FOG-TYPE SUSPENSION INSULATOR

For high-voltage lines in areas of severe contamination—salt fog, industrial fumes, or dust—Lapp Fog-Type suspension units provide maximum leakage distance per length of string—and for greater effectiveness of leakage distance, inch for inch.

SOLUTION: Lapp Fog-Type Design

Service dependability on lines subjected to severe contamination . . . industrial smoke and fumes, dust, or salt fog . . . can be assured—without frequent cleaning of insulators—and without danger of failure from leakage flashover. Lapp Fog-Type design provides superior performance for transmission, switch and bus support because of two basic superiorities of design principle . . .

1. UNIFORM LEAKAGE PATH

Leakage flashover results from a contaminated surface which is not uniform—wet areas lower total resistance, so increase leakage current until voltage flashes over narrow shielded areas, precipitating flashover of entire unit. Compare developed uniform leakage surfaces of 66 kv Line Post (on left side) with that of conventional pin-type (right) where variation in conductivity is 3.6 times as great.

2. SELF-CLEANING

Under heavy rain and wind, contamination rapidly flushes away. Fog-Type petticoats are so shaped and spaced that rain falling on one petticoat splashes and cleans the under side of the one above. Resistance increases, leakage current falls—uniformly and over entire unit.

Lapp

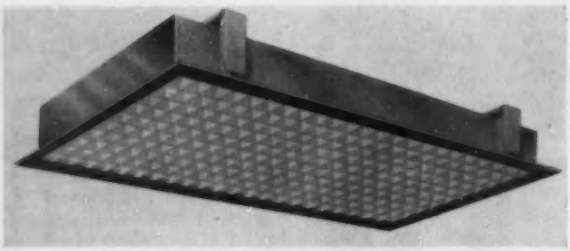
LAPP INSULATOR COMPANY, INC., LE ROY, NEW YORK

Manual Remote Control for Reclosers

(4) Line Material Co., Milwaukee 1, Wis.

For operating type H oil circuit reclosers, this manual remote control is said to cut operating costs. It provides an accessible handle near the pole base and eliminates the need for climbing. Designed for attachment to the recloser's sleet hood, the control consists of a permanently lubricated mechanism that engages the recloser operating handle, a housed flexible cable and an operating handle that can be locked to prevent unauthorized operation.

Although its operating handle may be locked, the control still allows the recloser operating handle to move to lockout position without interference. The device may be used either to open or to close a recloser; is available for ganged operation of one, two or three reclosers of multiphase installations.



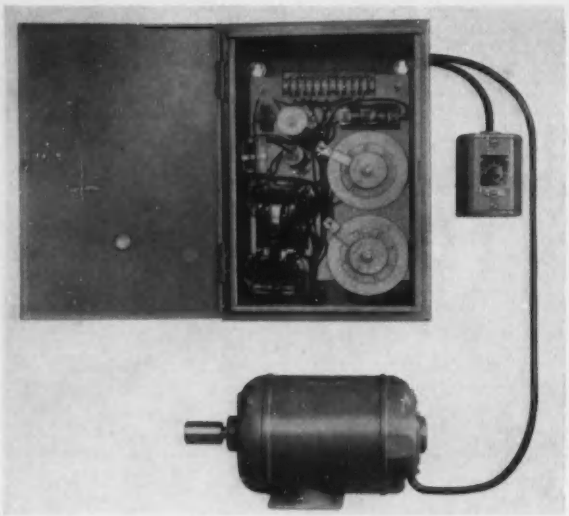
Large Area Recessed Light Source

(5) Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif.

The 3600 series is constructed of heavy-gage metal in modules of 2x2, 2x4, and 2x8 ft. Designed for flexibility, the units are said by the manufacturer to be readily adaptable to suspended grid ceiling systems as well as to standard joist or plaster frame mounting.

When installed in suspended grid ceilings, the fixtures are supported directly by runners. Pivot straps are provided at the four corners of the fixture body for installation conditions requiring suspension from overhead ceiling structure. The fixtures may be coupled in continuous rows without extra parts in any standard mounting method.

This series is available for four to eight fluorescent single-pin or bi-pin lamps. Diffusing elements may be metal louver with 32° shielding, ribbed glass or molded plastic panels, supported in piano hinged frames equipped with positive-acting, snap-lock latches.



Packaged Adjustable-Speed Motor Drives

(6) Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio

Bulletin 6520 Vari-Amp magnetic amplifier motor drive is a compact, self-contained unit that gives adjustable motor speeds from an a-c power source, its manufacturer states. It converts a-c power from a 115-v 60-cycle source to d-c power used to drive a d-c motor. Speed is continuously adjustable over the complete range by means of the small rheostat located on the control station.

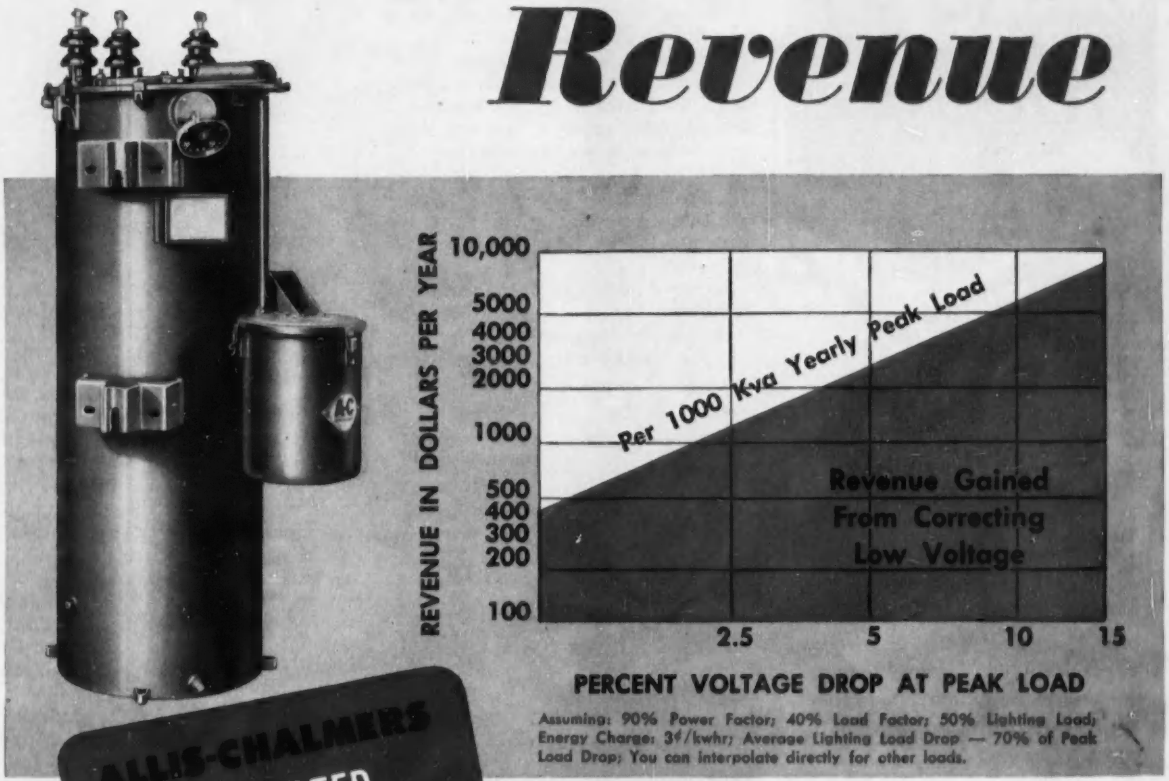
The standard unit will provide for a speed range of 10 to 1 and comes with motors ranging in size from 1/40 hp to and including 1/2 hp. The unit consists of three components — main control panel, control station and motor. It is completely self-contained, including in addition to the variable armature supply, field supply, control circuit and short-circuit and overload protection.

The basic unit has an on-off switch and speed-adjusting rheostat on the control station. Optional features include jogging, dynamic braking and reversing.

It employs a full-wave, self-saturating, magnetic amplifier unit containing no tubes or moving parts. Full-wave conversion permits use of a motor one frame size smaller than that required for half-wave units because there is less heating, the manufacturer states. No warm-up period is required before applying the load and maintenance is reduced; life expectancy is greater, the manufacturer claims.

For Additional Information and Manufacturers' Bulletins Fill in the Coupon on Page 52

HOW SMALL INVESTMENT ...Increases Revenue



ALLIS-CHALMERS 5/8% STEP VOLTAGE REGULATORS

The chart above shows it pays in increased revenue to get accurate voltage by using Allis-Chalmers distribution regulators. Initial cost is low. And operating costs are low too because you get reliable regulation with an absolute minimum of maintenance.

Get Years of Satisfactory Operation

...the *Quick-Break* mechanism has been field tested for twenty years in thousands of applications — it can withstand five million operations.

. . . long-life contacts are made of arc-resisting material in generous dimensions . . . will last for 40 years normal operation.

. . . unit construction makes top-quality workmanship possible because all connections can be made and inspected before tanking.

. . . installation and maintenance are easy — careful engineering eliminates necessity for highly trained operators.

Get More Facts

Your nearby Allis-Chalmers district office can supply you with complete information on distribution regulators. Call them or write Allis-Chalmers, Milwaukee 1, Wis.

4184

ALLIS-CHALMERS

● Wherever motor and generator brushes are used in this nation, you will find "OHIO'S" products among the leaders in the field in performance. There is a reason for this!

It is our policy to firmly believe—"That the most important part of a motor or generator is the brush. Properly designed brushes will give you proper commutation, *increase* motor efficiency and performance, and will *minimize* maintenance costs." Consequently, the reputation for EXCELLENCE that OHIO products have achieved is due to expert engineering and modern methods of production. REMEMBER:—OHIO brushes represent a tiny *investment* that pays giant *dividends*.

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Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

Polarized Connections

(7) Pass & Seymour, 1307 Milton Ave., Syracuse 9, N. Y.

An improved line of polarized electrical connections for equipment manufacturers and industrial operation has extra-strength bodies and heavier armor and metal parts. Top wiring and other time-saving features have been incorporated, it is stated.

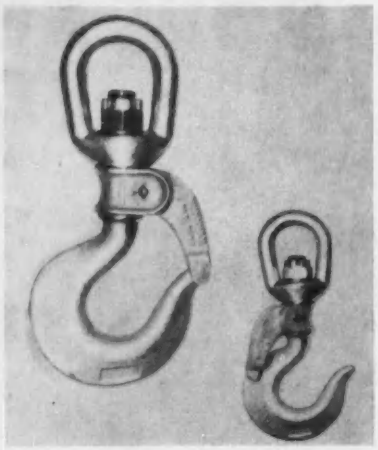
The receptacle has a sturdy black Bakelite body with ⅛ in. rivets, zinc-plated steel back and thick laminated phenolic back cover to prevent leakage. Terminals on contacts are designed for long life. The polarized caps are made of heavy steel armor with bright zinc plating and there are no exposed parts between armor and cap body.

Polarized outlets and caps are available in 10, 15, 20 and 30 amp for 2-, 3- and 4-wire connections. They are UL approved. Turn-lock polarized connectors are available also.

(8) SAVES COOLING WATER—Workman makes final adjustments on thermostatic unit of new temperature-controlled ignitron at General Electric Co.'s industrial tube plant, Schenectady, N. Y. The temperature control feature can save up to 95% of cooling water needs for the tube and also protects it from overheating in case water supply fails, the manufacturer reports. These tubes, interchangeable with corresponding standard ignitrons, are being produced by G-E in sizes B, C and D

(9) TAPE RECORDER — The Golden Tone Ekotape i. a new recorder designed to play at either of two speeds, 7½ in. or 3¾ in. per second. Made by the Sound Sales Division of the Webster Electric Co., 1900 Clark St., Racine, Wis.

To Secure Bulletins Fill in Coupon on Page 52



Safety Hook

(10) E. D. Bullard Co., Safety Hook Division, 275 Eighth St., San Francisco 3, Calif.

A newly introduced hook has a safety gate that locks automatically and will not open unless the pin is manually depressed. The safety gate uses the hook shank as its operating base but does not obstruct the throat, the manufacturer states. The rustproof gate may be adapted to fit all makes and sizes of standard hooks and is said to open and close with ease in all types of weather. It swings open horizontally on the shank axle so that the load will not snag in loading or unloading.

These hooks are drop forged steel. Component parts are cadmium plated. Noncorrosive safety gates are of brass and come with or without return spring for automatic closing. Rustproof lock pins are of Duronze. Hooks come in sizes 2 to 16A. Hooks with greater weight capacities are available on special order.

(11) STRINGING BLOCK—The Kenneloy triple-purpose block can be used for stringing transmission and distribution lines from top of pole arms, at angles from the arm and while hung from insulators, the manufacturer states. No special fittings or attachments are required. The block is made of special high-tensile-strength aluminum with bronze fittings, cadmium plated. It weighs about 8 lb. A feature is design of the sheave housing, which has an overhanging lip to prevent the stranded wire from slipping in between sheave and housing with resultant breakage or damage to the wire. A self-lubricated bushing eliminates the need for maintenance on the sheave, it is stated. Made by J. F. Hodgkins Co., Gardiner, Maine.

(12) STARTERS—A new line of fluorescent lamp starters has been announced by Harvey Hubbell Inc., Bridgeport, Conn. Named Jackrabbit, they are offered in types and sizes to meet all fluorescent installation requirements, according to the manufacturer.

Presenting the

NEW

NATIONAL ELECTRIC XDUCT CONDUITS!

They're new on the inside . . .
new on the outside!

Here's what these new conduits mean to you!

1. EASY FISHING—"Xduct's" new baked-on inside coating of aluminum enamel (patent applied for) was developed through intensive research in connection with important government projects. It provides minimum friction between conduit wall and wires. The result: Actual fishing tests conducted with five other leading brands of conduit prove "Xduct" is 66% easier to fish on constant pull—more than twice as easy to start.

2. SUPERIOR CORROSION RESISTANCE—National Electric's revolutionary new patented electrogalvanizing process electrolytically deposits pure zinc uniformly over the entire outside surface of "Xduct" conduit, including the threads. The result: a protective coating that adheres positively to the basic steel . . . possesses superior corrosion resisting qualities.

3. THREAD PROTECTION—Sharp, clean threads of "Xduct" rigid steel conduit are machined before galvanizing to assure complete protection from end to end. The result: every hill and valley of threads are completely galvanized.

4. SUPERIOR BENDING—High-ductile steel is used to assure easy bending.

5. DESIRABLE COLOR—"Xduct's" silvery color is highly acceptable for installation in exposed locations.

Fishing is easy with
"XDUCT" CONDUIT
Proved best by actual test

EVERYTHING IN WIRING POINTS TO

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3 Plants • 7 Warehouses • 34 Sales Offices

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FOR TRUE VALUE IN LIGHTING EQUIPMENT LOOK TO THE MANUFACTURER. You can compare design and test data. But for Continuous Dependability you must rely on the maker. Behind Miller are 110 years' experience—million-dollar production facilities—1000 combined man years of field lighting engineering. Fluorescent, Incandescent, Mercury fixtures for industry, commerce, schools.

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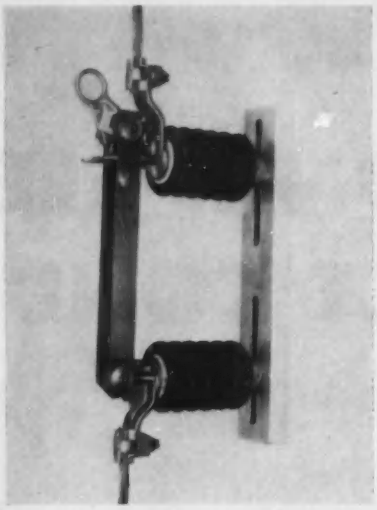
R. C. English, 3814 N. E. Wasco St., Portland, Ore.
S. Babcock, 2342 Franklin St., San Francisco, Calif.



Distribution Line Switch

(13) Southern States Equipment Corp., Hampton, Ga.

This type PH distribution line switch is available in 7.5 and 15 kv in continuous current ratings of 200 and 400 amp. It is a single-pole, single-throw, hook-operated switch specifically designed for wood crossarm mounting in vertical or underhung positions.

Features listed by the manufacturer are high-pressure line contacts, positive latching, parallel blade construction, integral terminals and blade pryout action.

(14) GASKET — To stop light leakage around frames, a fiber glass gasket has been developed by Marvin Mfg. Co., 3071 E. 12th St., Los Angeles 23, Calif., and is standard equipment on Marco recessed lighting fixtures. In addition to stopping light leakage, it prevents dust and insects from accumulating inside the fixture, the manufacturer states.

(15) CONNECTORS — Two battery or portable-type mating receptacles and plugs with center polarized pins and sockets have been announced by H. H. Buggie Inc., Toledo, Ohio, for walkie-talkie equipment and similar applications in the electronics field. Both have eight contacts. No. 2411 receptacle is pressurized to withstand 5 psi; is 1⅜ in. diameter, ⅞ in. thick and is designed for panel mounting with spanner ring. Mating plug No. 2413 has hood with pull ring and right angle cable clamp. HHB No. 2412 receptacle has a square flange for panel mounting; mounting dimensions are 1 1/16 in. center-to-center holes; thickness is ⅛ in. It is unpressurized and has Teflon rear insulator for high impact resistance. Mating plug No. 2611 has a hood with pull ring and right angle cable clamp.

Use Coupon, Page 52, to secure manufacturer's literature on these products

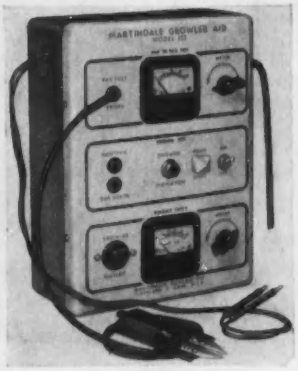
Trouble Lamp

(16) Crouse-Hinds Co., Syracuse, N. Y.

A lightweight, explosion-proof trouble lamp has a concentrated beam of light to assist maintenance men in hazardous locations. This new type EPLH lamp is said to be especially practical for inspecting interior areas of oil and gasoline drums or process vessels and tanks as well as for illuminating inaccessible gages.

It consists of a cast aluminum cylindrical shaped lamp chamber, concentrating lens, composition handle, support hook and explosion-proof cord connector with mechanical cord grip.

A strong beam of light is supplied by a 12-v auto lamp. An essential accessory for supplying current is an explosion-proof 120/12-v transformer.



Growler Aid

(17) The Martindale Electric Co., 1306 Hird Ave., Cleveland 7, Ohio

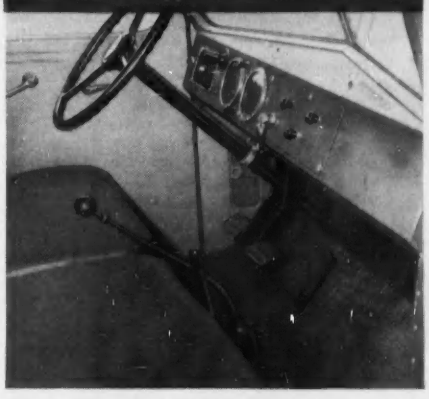
This device, model 153 growler aid, checks for short circuits, open circuits and grounds on armature and stator windings before assembly. Sensitive meters on the short-test and bar-to-bar-test sections show up defects by means of comparative readings, according to the manufacturer. Part of the tests are made in conjunction with a growler, such as the manufacturer's types U-2 or B-1; others, such as the 500-v ground test, can be made without use of a growler, it is stated.

(18) SEALER—A dielectric sealer, EC-1120, developed initially for the aircraft industry, is said to be useful also in electrical equipment. Designed for use as a flexible potting compound on electrical wiring connections, it retains physical properties throughout a temperature range of −65 to 200 F and incorporates excellent dielectric properties, moisture and water resistance and durability, according to the manufacturer, Minnesota Mining & Mfg. Co., Adhesives and Coatings Division, 423 Piquette Ave., Detroit 2, Mich.

NEW FWD FOURMASTERS

with

meet today's Utility needs for more versatile truck performance



IMPROVED ALL-STEEL SAFETY CAB — Live rubber shock absorbers and improved twin-pivot support dampen off-the-highway jolts; adjusting comfort seat is a full 70" wide; suspended, cab-mounted foot pedals assure leverage regardless of driver height, eliminate floor openings.

With more and more off-the-highway locations and relocations in the picture, your *need* for units that *don't* need roads is greater than ever before. New FWD FOURMASTERS with exclusive Math-Matic Design *put the power where there's work to be done* by properly proportioning torque to weight.

Up to 82% greater tractive ability*—30 to 37% longer tire life*—same fuel consumption as rear-wheel drive trucks*—safest by far to operate under any on-or-off-the-highway conditions* . . . these are the dollar and sense reasons why utility officials everywhere are turning to new FWD FOURMASTERS with Math-Matic Design. THE FOUR WHEEL DRIVE AUTO CO., CLINTONVILLE, WIS., *Canadian Factory*, KITCHENER, ONT.

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BUILDERS OF AMERICA'S FOREMOST HEAVY-DUTY TRUCKS

*TRUCK RESEARCH PROJECT CONCLUSIONS . . . *For the published results of 7 years' intensive research by the University of Wisconsin's College of Engineering, write now for your free copy of "The Truck That Went to College."*

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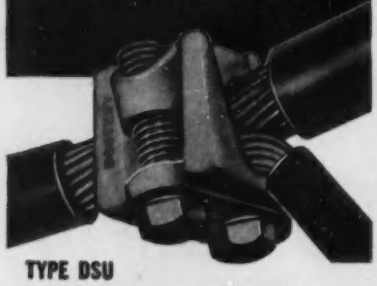
CONNECTORS
"50 YEARS MAKE THE DIFFERENCE!"



TYPE DSU
RUGGED and DEPENDABLE
DOSULON

A one-piece bolt type variable service tap. Available in conductor sizes from 1/0 to 1000 MCM in copper or equivalent all-aluminum or ACSR cable sizes in type DSUN. Made of high strength copper alloy and equipped with silicon bronze bolts. Rugged, compact, facilitates neat taping.

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IMMEDIATE DELIVERY!

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El Paso, Texas
Kansas City, Missouri
Knoxville, Tennessee
Lakewood, Colorado
Little Rock, Arkansas
Minneapolis, Minnesota
New Orleans, Louisiana
Omaha, Nebraska
Philadelphia, Pennsylvania
Richmond, Virginia
St. Petersburg, Florida
St. Louis, Missouri
San Francisco, California
Seattle, Washington
Williamsville, New York

DOSSERT
MFG. CORP.
249 HURON STREET, BROOKLYN 22, N. Y.
SINCE 1904

Duplex Outlet

(19) Pass & Seymour Co., Syracuse 9, N. Y.

Designed to simplify installation of additional plug-in receptacles in residential, commercial and institutional buildings, the 500 U-AD-M duplex outlet has no metal boxes to screw into the wall, no holes to punch out, no extra clamps, soldering or taping, its manufacturer states. Housing and face plate act as insulator.

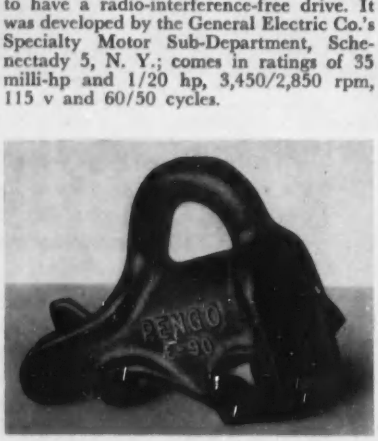
This duplex outlet is for use with nonmetallic sheathed cable. It comes in brown or ivory Bakelite, with face plate styled to blend with modern or traditional interiors.

(20) **BUILDING WIRE** — Thermoplastic building wire is being made now by Ettco Wire & Cable Corp., 45-50 Metropolitan Ave., Brooklyn 37, N. Y., in addition to its other products.

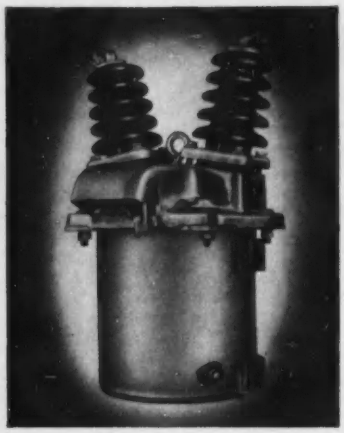
(21) **CONTROLS** — A new line of time switches for controlling on-off cycles of one hour or less has been introduced by International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill. The new units are known as the Inter-Matic series T670 time switches.

(22) **BOOSTER**—A power booster claimed to increase the output of any 10-w mobile radiotelephone transmitter six times has been announced by Kaar Engineering Corp., Middlefield Road, Palo Alto, Calif. It is inserted between the low power transmitter and antenna.

(23) **SMALL MOTOR** — An induction-type electric motor for business machine manufacturers has been added to the G-E line and is claimed to be quiet, sturdy and to have a radio-interference-free drive. It was developed by the General Electric Co.'s Specialty Motor Sub-Department, Schenectady 5, N. Y.; comes in ratings of 35 milli-hp and 1/20 hp, 3,450/2,850 rpm, 115 v and 60/50 cycles.



(24) A PULLING EYE for use in installing preformed guy grips has been developed by Petersen Engineering Co., Santa Clara, Calif. The eye slips over the anchor rod, with sufficient offset to allow preformed guy grips to be wrapped around the guy wire without interference with the chain hoist used to pull it tight, the manufacturer states. Weight of this Pengo E-90 pulling eye is 2½ lb. Product details may be secured from the manufacturer.



Sectionalizer Has Higher Rating

(25) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

This new 140-amp automatic feeder line sectionalizer, type GRS, was designed to extend use to higher capacity feeder circuits and make the unit more adaptable for reclosing circuit breakers and large oil reclosers. Basically it is a series-connected device that counts pulses of fault current created by opening and closing of the automatic circuit breaker and isolates the feeder line after a preset number of counts.

The unit is oil filled and can be used safely to break load currents up to 220 amp, its manufacturer states. The device will operate 2,000 to 5,000 times without maintenance if necessary. It is trip free and can be set to trip open after one, two or three operations at or above 220 amp. It has been applied on distribution circuits up to 15,000 v, according to the manufacturer.

(26) **DRAWING BOARD** — A portable drawing board molded of clear polystyrene plastic weighs less than 8 oz.; measures 9¾x12¼ in. Four corner clamps are provided for attaching 8½x11 sheets. These clamps are recessed into the plastic so that a triangle or ruler can ride freely over them. Two metal straight edges, one horizontal and one vertical, are retractable. Tension clamps on the under side provide for storage of triangles. Offered by Graphostat Co., 110 Eaton Place, East Orange, N. J.

(27) **SHOWS ANGLES**—The Krollometer has a movable dial face that shows all angles in degrees on one side and on the other side translates the degrees to inches per foot drop, carpenter square measurements and percentages of grade. This plastic instrument is six inches square by three-quarters of an inch thick. The styrene meter has two built-in spirit level units in the dial. Any angle can be set on the meter and work done directly from it without additional figuring, according to the manufacturer, Christensen & Kroll, P. O. Box 284, McMinnville, Ore.

CIRCUIT BREAKERS

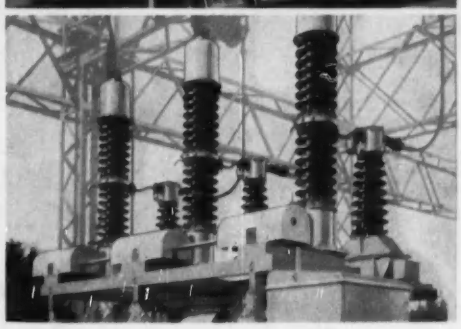
"Manufactured in and for the Electrical West"

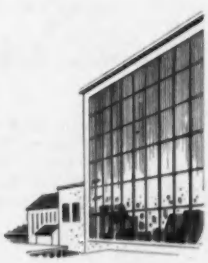
ENGINEERING . . .
Pacific Oerlikon Power Circuit Breakers are a proven design, precision built to assure you years of trouble-free performance.

SPECIALIZATION enables Pacific Oerlikon to maintain an uninterrupted production of Power Circuit Breakers . . . your assurance of continued highest quality at lowest possible cost.

LOCATION . . .
Pacific Oerlikon's plant site at Tacoma provides facilities for swift, safe shipment to customers throughout the Electrical West.

RELIABILTY . . . Pacific Oerlikon low-oil-content Power Circuit Breakers are simple and rugged and provide excellent performance under all operating extremes. Components are light and easy to handle. Maintenance is uncomplicated and economical throughout their dependable long life.





Pacific OERLIKON Company

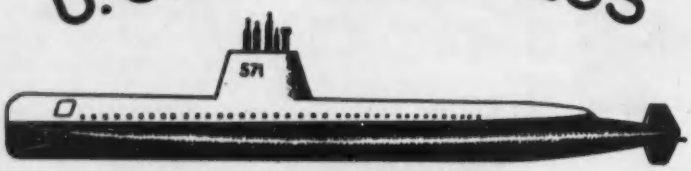
P. O. BOX 1133 TACOMA 1, WASHINGTON

"Manufactured in and for the Electrical West"

.....another Shawmut first

Amp-traps*

For U.S.S. NAUTILUS



FIRST NUCLEAR POWERED SUBMARINE

...How about letting Amp-traps stop dangerous short circuits for you?

In Canada — Powerlite Devices, LTD.

©The Chase-Shawmut Co. 1953 *Trade Mark

THE CHASE-SHAWMUT CO., NEWBURYPORT, MASSACHUSETTS

385 MERRIMAC STREET

Light Poles

(28) Pacific Gas & Foundry Co., Renton, Wash.

Standard steel light poles are available in heights from 21½ to 31½ ft. Underbraced brackets come in 4, 6 and 8 ft lengths; overbraced brackets in 10, 12 and 15 ft lengths. Optional modifications and accessories include hand hole; festoon outlet; attachment lug and side wire entrance for aerial ballast; ornamental anchor bolt nut covers; top wire entrance and feeder arms for all types of overhead wiring; a choice between anchor base, integral transformer base or detachable transformer base poles.

Brackets may be used with the pendant-type, side-mounted or slip-fit-mounted luminaire. The standard pole tubes are fabricated of 11-gage hot-rolled carbon steel. Heavier gages are available. Pole tubes are octagonal in section, continuously tapered and topped with a ventilated cap.

Four anchor bolts, with two nuts each, are supplied with each pole. Erection and plumbing are accomplished in a single operation and without shimming, the manufacturer states.

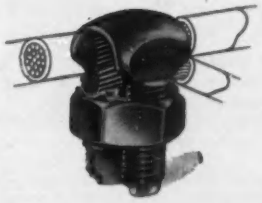
These poles are said to meet all requirements of the IES street lighting code.

(29) **COLOR LAMPS**—Expansion of its Colorbeam reflector lamp line has been announced by Amplex Corp., 111 Water St., Brooklyn 1, N. Y. The line now has 14 color lamps ranging from 75 to 300 w. Details may be secured from Department CB of Amplex.

(30) **MARKERS**—A Blue Streak release coating on its products permits quick, effortless removal from dispenser cards, according to the W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 12, Wis. Wire markers, write on labels, safety signs are among the manufacturer's products.

Fill in the Coupon on Page 52

for CONNECTORS...



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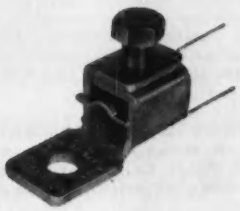

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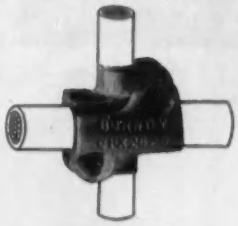

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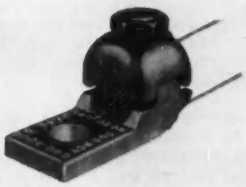

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YOUR BASIC SOURCE FOR LATEST DEVELOPMENTS IN ELECTRICAL CONNECTORS

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With more than 30,000 individual Burndy connector designs—Burndy is ready to serve your connector needs promptly, efficiently. 70 graduate engineers will help you solve any connector problems in joining, terminating, clamping, or grounding every size and type of electrical conductor.

Burndy connectors and tools provide maximum mechanical strength and electrical efficiency —at low installation cost. Write for free technical counsel or catalogs . . . to

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GREENLEE HYDRAULIC BENDER

Yes, quickly make bends *exactly* as you want them, when you want them, where you want them. Compact, portable GREENLEE Hydraulic Pipe and Conduit Bender lets you do this in a jiffy. *One-man operated* to produce smooth, accurate bends in just a few minutes . . . in pipe up to 5", rigid and thin-wall conduit, tubing, busbars. Owners report time savings up to 60% or more, elimination of cost for manufactured bends and fittings, and "clean", tailor-made installations every time. Get facts now on this time-saving tool that often pays for itself on first few jobs! Write for free Bender Booklet, Greenlee Tool Co., 1761 Columbia Ave., Rockford, Illinois.

GREENLEE

Other GREENLEE timesaving tools for electrical work: Hand Benders; Joist Borers; Cable Pullers; Knockout Tools; Auger Bits and Drills.

BULLETINS ETC.

(31) INTERNAL PRINTING DEPARTMENT—Photo offset printing and processing for internal printing departments in business and industry are described in a 16-page booklet released by Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

(32) TESTING INSTRUMENTS—A buyer's guide on electric testing instruments is offered by General Electric Co., Schenectady 5, N. Y. GEA-5469B gives application data.

(33) SPACE HEATING—A guide for calculations of electric space heating is offered by Cavalier Corp., Electric Heater Division, Chattanooga 2, Tenn. It is designed as reference for calculating electric heating requirements and estimating costs.

(34) DESLAGGERS—Vulcan wall deslaggers are described in bulletin 1016 from Copes-Vulcan Division, Continental Foundry & Machine Co., Erie 4, Pa.

(35) TESTING INSTRUMENT—A new high voltage d-c testing instrument, model 424 d-c Hypot, is described in bulletin 14AA from Associated Research Inc., 3758 W. Belmont Ave., Chicago 18, Ill. Requests should be addressed to Robert G. Davis.

(36) SUBSTATIONS—Selection of a load center unit substation to meet specific power requirements is the subject of a 24-page booklet offered by Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. Titled "Power at Load Centers Pays Off," the booklet is designated 11B6285B.

(37) CONNECTORS—Interlock connections featuring an automatic locking connection are described in a data sheet from Harvey Hubbell Inc., Interlock Department, State & Bostwick Ave., Bridgeport, Conn.

(38) TRANSFORMERS—Hevi Duty Electric Co., Milwaukee 1, Wis., has a new manual, "Operation and Maintenance of Dry-Type Transformers." A simple trouble chart helps find trouble spots and gives remedies.

(39)—COMPUTER—A pocket-size wiring data and weight computer has been designed by the Hatfield Wire & Cable Division of Continental Copper & Steel Industries Inc., Hillside, N. J. Copies may be secured from J. Q. Bourne, Department 9, by writing on company letterhead.

(40) HEATERS—Typical applications and operating characteristics of Chromalox electric circulation heaters are given in an eight-page bulletin (701) offered by Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa.

(41) CARRIER—A 16-page booklet describing its new type FD power line carrier equipment is available from Westinghouse Electric Corp., Department TP-286, 2519 Wilkens Ave., Baltimore 3, Md.

(42) DRY-TYPE TRANSFORMERS — An eight-page illustrated booklet on its type E totally enclosed nonventilated dry-type transformer is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. This transformer comes in ratings from 3 to 50 kva for either indoor or outdoor service.

(43) SWITCHGEAR — Station-type cubicle switchgear is described in a 24-page booklet (B-5670) from Westinghouse Electric Corp. This type of switchgear is intended primarily for heavy-duty service in electric utility generating and distribution substations.

KILL TWO BIRDS WITH ONE STONE—Fill out this one coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST *Not good*
68 Post St., San Francisco 4, Calif. *after March 1*

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
39 40 41 42 43

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NAME..... TITLE.....

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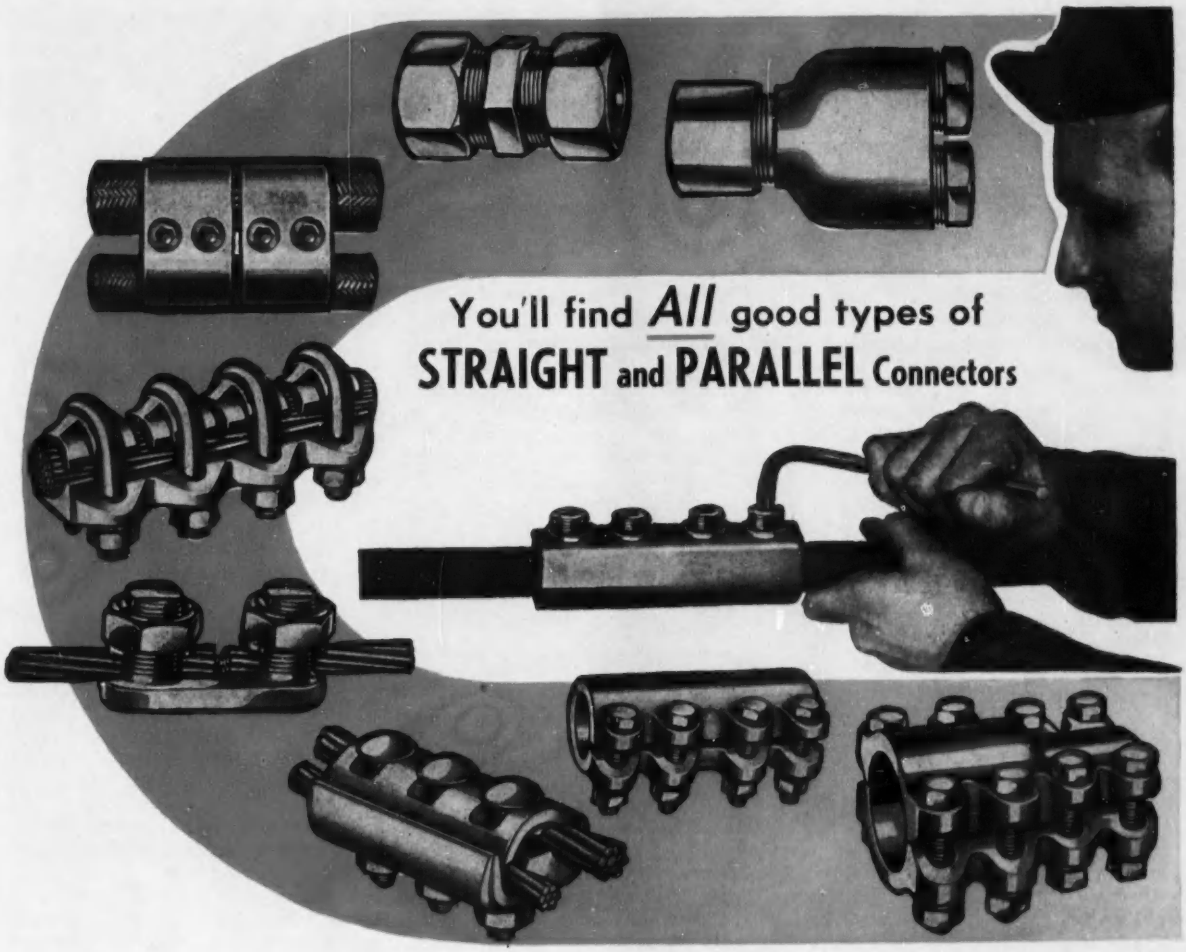
CITY..... ZONE..... STATE.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.



in the *Complete* line

Yes, it's mighty handy to open your Penn-Union Catalog and pick the exact type you need. They're all there—in a complete range of sizes: Bolted straight connectors . . . screw type . . . various split sleeve types . . . shrink fit . . . universal clamps . . . E-Z connectors with yoke and nut, etc.

The Penn-Union Catalog also gives you the *complete* line of Service Connectors, Tees, Cable Taps, Grounding Connectors, Lugs, Power Connectors, etc.

Preferred by leading users—who have found that *"Penn-Union" on a fitting is their best guarantee of unfailing service.*

KENNETH ANDERSON CO.
412 Seaton St.
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San Francisco

PENN-UNION ELECTRIC CORP., ERIE, PA.

THE *Complete* LINE OF CONDUCTOR FITTINGS

PENN-UNION

ELECTRA'S HUSBAND

ONE of our favorite programs at home is the Telephone Hour. The music and the artists seem to fit our tastes — melodious, not too highbrow, with artists we know and enjoy. The commercials are in as good taste as the music — sincere, simple and short. The program on the last Monday in November was no exception, save that the commercial won extra special commendation from Electra. Just after the music finished she said:

"Human . . . living . . . personal . . . and friendly. You know Mr. Cleo Craig, president of AT&T, said something your electric utility friends can take to heart. That was just about as fine a sermon on the responsibilities of business as I've ever heard from a top executive."

"Chances are that not very many electric utility people were listening," I commented. "Too much competition from TV at this time of night. Besides people don't like sermons. But I will agree with you. That particular one was right to the point."

"You know, don't you, that it's easy to get a copy of what he said," she reminded. "All you need do is write for it."

Here is part of what the letter brought in return. It quotes what Cleo Craig, president of the American Telephone & Telegraph Co., said at the time the fifty millionth telephone was installed in President Eisenhower's office.

"President Eisenhower's acceptance this morning of the fifty millionth telephone was a gracious and inspiring recognition of the part we play in the life of the nation. The President has done us a great honor. He has also given us, I think, new cause to weigh our opportunities and responsibilities.

"Let me recall to your minds something the President said on a previous occasion. I think the connection will be clear.

"In his inaugural address last January he observed that the strength of all free peoples lies in their unity. And then he went on to say, 'To produce that unity, to maintain our place in the world, destiny has laid on this country the responsibility of the free world's leadership.'

"And what does all this mean to us who provide America's telephone service?

"To my notion it means that a very considerable part of the responsibility the President speaks of rests on us. The nation's capacity for leadership in the free world begins with unity at home. If Americans are to come together and work together with the greatest effectiveness, they must be just as free as possible to talk with each other. They must learn from each other, and think with each other, and grow with each other. And in order to do those things they have to communicate. And they must be able to do so with complete ease and freedom, wherever they are and whatever their need.

WHEN YOU PICK UP THE PHONE —

"I hope profoundly that none of us will ever forget the true nature of the service we render.

"It is human—and living—and personal—and friendly.

"It's something we do for the family next door and for the business down the street.

"The real meaning of fifty million telephones is not in their total number but in the people we bring together in every community in the land.

"We can only make a nation of neighbors by being good neighbors ourselves—good neighbors to everyone we serve, in every community and corner of the land. That is the way, and the only way, for us to keep on increasing our contribution to the unity of our country, to the strength of free peoples, and to the hope of peace in the world."

When the script of the statement was received, I reread it to Electra. Both of us were as impressed with it as we were when we listened to it.

"Just change a word and a phrase here and there and that would apply equally well to the electric companies and the service they provide," she said thoughtfully. "It could be compressed into a wonderful New Year's resolution. Human—living—personal—and friendly. Your utility friends wouldn't be beset by so many troubles if they would all—from top to bottom—resolve to be just that."

"DO you want to know how to buy every man, woman and child in the United States an electric range and refrigerator?" I asked Electra one evening recently.

"No, I don't," she countered. "But go ahead and tell me. What's the gag?"

"There's no gag," I retorted defensively. "All you have to do is eliminate every kind of a tax for just a year. I've just been reading about big government in this report from the U. S. Chamber of Commerce. It says that the total cost of all government agencies in this country—federal, state and local—for the fiscal year ending June 30, 1952, was $101.5 billion. That's $646 for every man, woman and child. And for $646 you can buy a good range and a good refrigerator."

"That must buy a huge amount of government," she mused.

"It finances a government colossus," I continued. "If you add up all of the divisions of government in this country you come out with an actual count of 116,743 major units. This figure includes the federal government, the governments of the 48 states, 3,049 counties, 16,778 municipalities, 17,202 townships, 67,346 school districts and 12,319 special districts."

"You sound like Amos and Andy," she interrupted.

"I'm only half finished," I admonished. "In the federal government alone there are 13 departments, 9 agencies, 19 commissions, 29 administrations, 22 corporations, 630 offices, 127 services, 107 bureaus, 627 divisions, 32 branches, 58 boards, and 444 miscellaneous units. And many of the state governments have setups almost as numerous."

"Why don't you stop before you run out of numbers and let me beat you at a game of scrabble?" Electra interrupted.

She did, too.

A new Hot Spray System now used by Allis-Chalmers effectively substitutes heat for solvents in painting, to produce a higher quality finish than conventional spray processes. A smoother surface is achieved with a uniform coating that offers greater resistance to contamination and corrosive action. Pole type distribution transformers in ratings through 50 kva get this new surface treatment.

Paint Heated to 160 F

The fact that cold paint is thicker than paint kept at normal room temperature is widely recognized — cold paint takes more solvent to make it flow and atomize. In the new Allis-Chalmers hot spray process, alkyd-resinous paint is heated to 160 F. Only 15% solvent is required, compared to the 40% solvent needed in conventional spraying at normal temperatures. Since there is far less solvent to evaporate, shrinkage after the paint is applied is greatly reduced. And better filling properties, brought about by improved flow and atomization, result in a smoother surface with greater gloss and excellent coverage.

Tests Prove Value

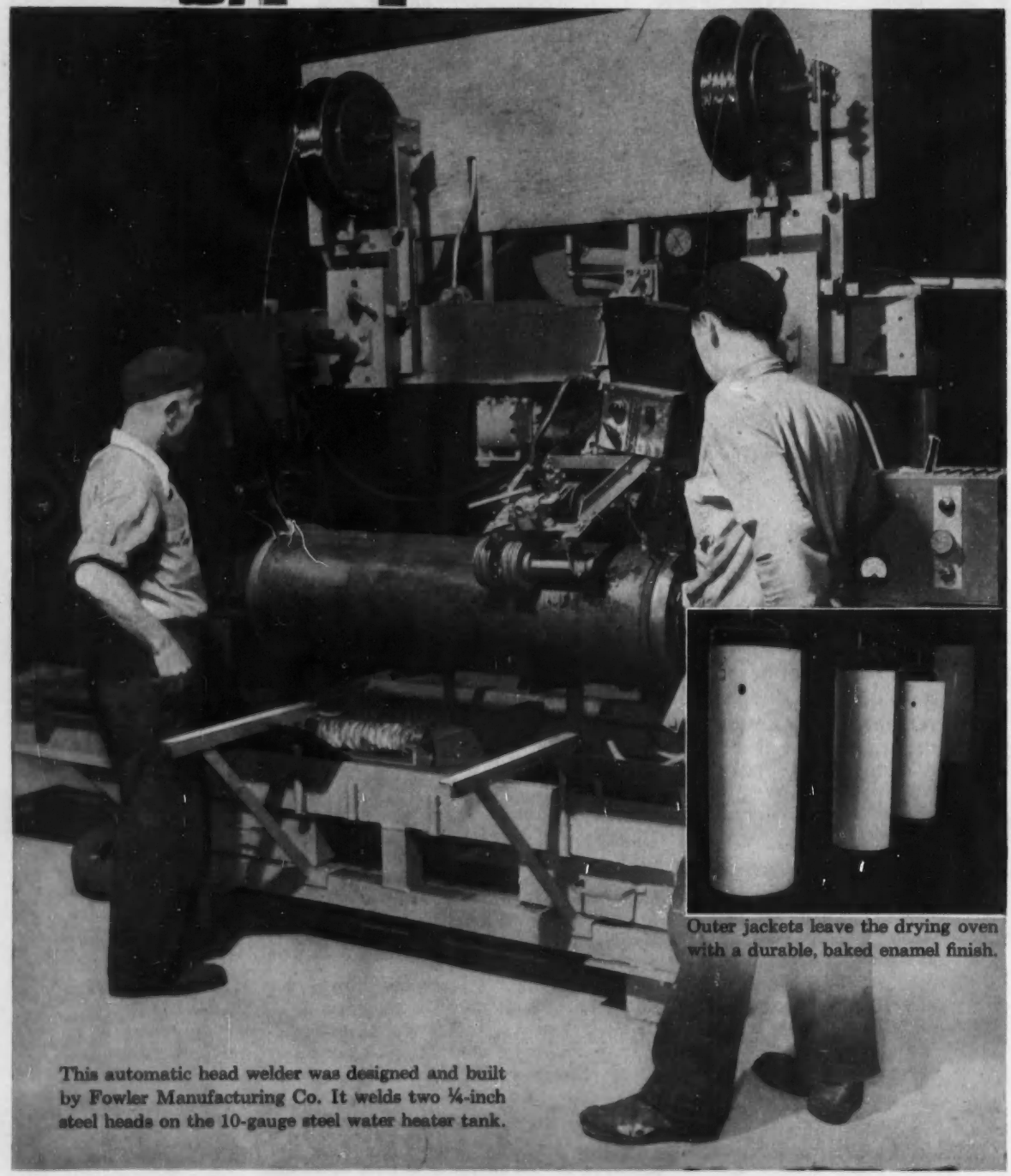
Tests conducted at Allis-Chalmers and at the Sub-Tropical Testing Laboratories at Miami, Florida show conclusively that tanks first cleansed and treated by Spra-Bonderizing and then Hot Spray painted have a superior protective surface. Test conditions included salt spray, humidity and sunlight as well as industrial atmosphere.

For more information on Allis-Chalmers new hot spray system as applied to distribution transformers, contact your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4201

ALLIS-CHALMERS

Inside of tank is coated with porcelain

Here's how U·S·S are used in



This automatic head welder was designed and built by Fowler Manufacturing Co. It welds two ¼-inch steel heads on the 10-gauge steel water heater tank.

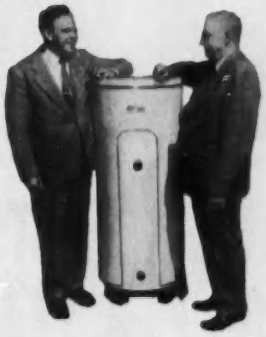
Outer jackets leave the drying oven with a durable, baked enamel finish.

Steel Sheets making Fowler Water Heaters

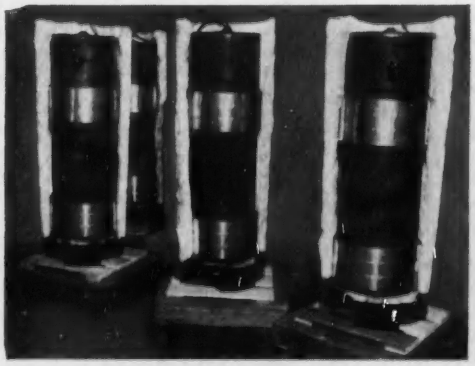
The Fowler Manufacturing Company, Portland, Oregon, is one of America's pioneer water heater manufacturers, with over 35 years of experience. They use large tonnages of tailor-made, high-quality U·S·S Steel Sheets each year in making clothes dryers, and gas and electric water heaters for homes, farms, and industry.

Steel designed for a specific purpose

From the very beginning, steel from Columbia-Geneva is tailor-made to do the best job for you. Knowing the end use for your steel, and working within the appropriate standards for your particular application, Columbia-Geneva metallurgists and other trained technical personnel are able to rigidly control the steel from start to finish. The results of this extra attention show up in the high quality of your finished products, and in the lack of rejects on your production line. For additional information or technical assistance, call your nearest Columbia-Geneva District Sales Office, or write Columbia-Geneva Steel Division, 1403 Russ Building, San Francisco 6.



Mr. P. L. Fowler (right), President of Fowler Manufacturing Co., with one of the Columbia-Geneva Technical Field Representatives who are always available to help solve your steel problems.



In final assembly, heavy Fiberglas insulation is sandwiched between tank and outer jacket.

22-gauge U·S·S Steel Sheets are rolled to make one-half of the outer jacket for the Fowler Water Heater.

U·S·S Steel Sheets

Columbia-Geneva Steel Division · United States Steel Corporation

USS

UNITED STATES STEEL

EFFECT OF TRANSMISSION LOSS calculations on AG&E system is discussed by D. K. Blake, Mgr. Transmission Engr. and S. B. Crary, Mgr. Analytical Engr.

NEW "PENALTY FACTOR COMPUTER" EXPECTED TO SAVE $100,000 PER YEAR ON INTERCONNECTED SYSTEM

Brings Top System Efficiency by Co-ordinating Transmission Losses with Plant Performance, Fuel Costs

Developed after two and one-half years of research by General Electric working with American Gas & Electric Service Corp., a new "penalty factor computer" will make optimum system operating economy a reality. It permits the load dispatcher to take into account the many constantly and rapidly fluctuating conditions on the lines as well as in the stations.

The electronic computer brings transmission losses into the load scheduling picture, permitting almost instantaneous calculation of the most efficient generation scheduling. Resulting savings of $100,000 per year are expected by A.G.&E.

OPTIMUM SYSTEM ECONOMY will be approached when this incremental fuel cost slide rule at A.G. & E.'s System Production Co-ordinating Group Office in Columbus, Ohio, is teamed with new computer.

Applicable to Other Systems

The "penalty factor computer" eliminates the current practice of approximating the corrections for adverse effects of transmission losses. It supplements the incremental fuel cost slide rule now used to allocate generation facilities under varying conditions of load and capacity. And it permits the load dispatcher to quickly order changes at far-away generating stations after rapid calculation of line losses.

Although originally developed to obtain top economy on the A.G.&E. system, the new computer will be applicable to other systems.

Increased Need for Co-ordination

It meets the increasing need for proper co-ordination of incremental fuel costs and transmission losses caused by:

1. Economic factors and availability of fuel, water, etc., that necessitate location of generating plants at greater distances from load centers.
2. Installation of larger blocks of power which often results in necessity of transmitting power out of a given area until load in that area equals newly installed capacity.
3. Interconnection of power systems for purposes of economical interchange and reduction of reserve capacity.

For more details on the new "penalty factor computer," write for GET-2415. General Electric Co., Schenectady 5, N. Y.

301-245

MORE POWER TO AMERICA

GENERAL ELECTRIC

JANUARY 1954 Vol. 112, No. 1

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Spot Survey shows that

One EE Is Needed for Each 10,000 Kw

Spot check made by Electrical West staff reveals that at least 1,500 "60-cycle" electrical engineers are at present employed by electric utilities in the 11 Western states; and that 10%, or 150 more, are needed each year to meet the industry's growth, which interestingly enough is also 10%. But university engineering faculties report little or no recruiting by utilities.

One electrical engineer is needed for each 10,000 kw. That fact has been established from a spot survey made by the editors of ELECTRICAL WEST. Much has been written and spoken on the problem of the growing shortage of power engineers but to our knowledge no one has attempted to set up any sort of a yardstick by which the power industry's future yearly requirements could be determined. It would seem that this is an important approach to the problem. Otherwise, how can the industry and universities set up realistic recruiting programs?

Many questions in this area of utility operation have never been completely answered. How many electrical engineers are needed to design, construct, operate and maintain a modern utility system? How does the number vary as the size of the system varies? What is the future of the "60-cycle" EE?

EE Requirements

This fall ELECTRICAL WEST undertook a pilot study to find the answers to some of the quantitative questions. The object was to determine whether or not a yardstick of EE requirements could be developed in terms of one or more of the readily measured physical elements of the industry. A representative group of Western utilities, both private and public, supplied figures on their current and past employment of electrical engineers. Electrical power equipment manufacturers and consulting engineering organizations were contacted also to round out the picture.

Data were received from companies accounting for slightly less than half the total generating capacity of the region so that, even though the study was definitely of a pilot nature, it was felt that the conclusions are valid and sound. Variation in personnel accounting procedures, especially where past employment figures are concerned, makes direct comparison between utilities impossible.

Yardstick Found

There is apparently a very close relation between the installed generating capacity of a system and the number of 60-cycle electrical engineers employed. In the larger systems this figure seems to be constant at 0.9 engineers for every 10,000 kw of capacity. On smaller systems the figure varies both sides of the constant, and so a working yardstick of one EE for every 10,000 kw of generating capacity is assumed.

This yardstick checks quite well against available employment figures for past years although it is apparent that the number of engineers does not increase quite as rapidly as plant capacity increases. Over-all, the electric power system of the West has increased by 131% since 1940; over-all employment at all levels has increased perhaps 65%. But the largest systems have increased their over-all employment by less than 60%, even though their plant expansion has been as great, or greater, percentagewise than the smaller systems.

Data gleaned in the spot check survey indicate that current and future additions to Western power systems will require new electrical engineers at the rate of about 60% of the yardstick figure. This means that six additional 60-cycle electrical engineers will be needed for every 100,000 kw of new capacity installed.

Capacity additions in the 11 Western states are running over 2,000,000 kw annually at the present time. At least 120 additional electrical engineers will be needed each year as long as this expansion continues. We need this many just to keep up with current growth.

There is also the problem of engineers needed to replace older men who retire and others who leave the utility industry for one reason or another. If we apply the yardstick figure of one engineer per 10,000 kw to the Western states total capacity we approximate 1,500 electrical engineers currently employed in Western utility operations.

Companies checked in the survey all show about 10% turnover among their electrical engineers annually. Of the 150 engineers who change employment each year, about 30 are retirements who leave a gap that must be filled by new engineers. The rest merely shift employment to manufacturers, to consultant firms, to other utilities or to other areas.

When we combine the minimum of 30 bona fide retirements needed to keep the current system staffed with the 120 additional engineers needed to keep up with current growth, it is apparent that there is a firm market in the Western utility companies for 150 60-cycle electrical engineers a year at the present time. Where are they coming from and what are Western utilities doing to recruit them?

Utilities Not Recruiting

To get some kind of an answer to these questions, ELECTRICAL WEST checked with several West Coast en-

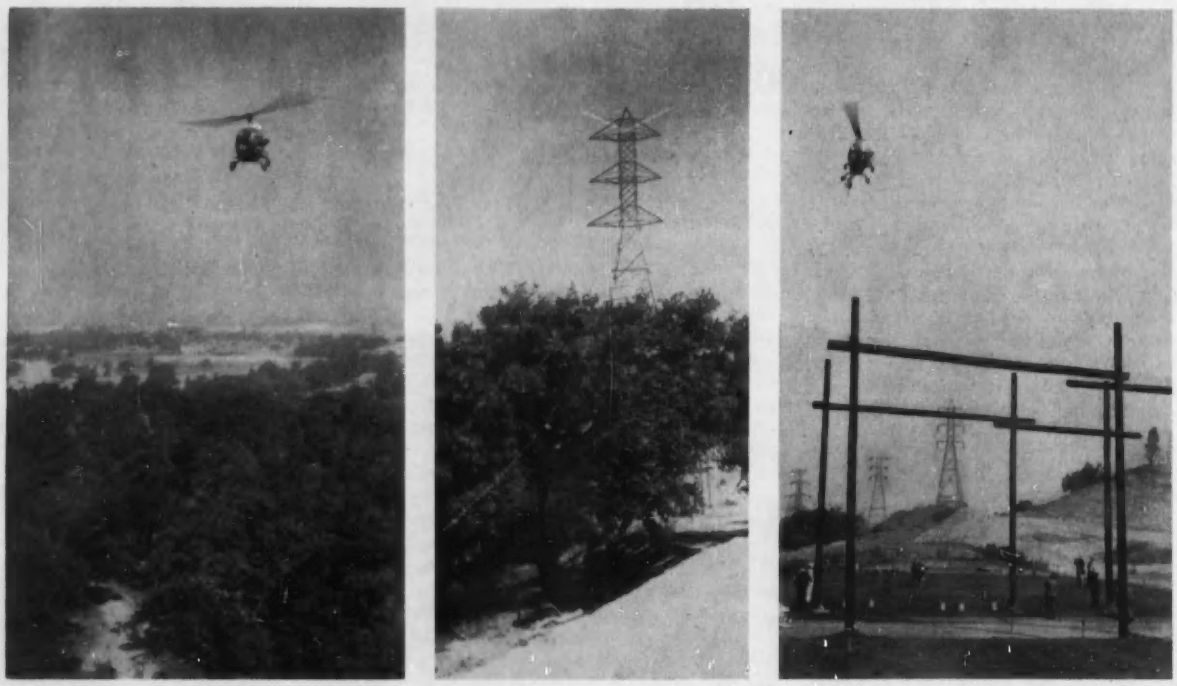
gineering faculties. This was done also on a spot basis, but opinions and comments received were in remarkable agreement, even from widely separated points. Once again, facts and figures are not readily available or comparable because of vagaries of record keeping.

In general electrical engineering faculty members agree that, although the total number of electrical engineering students is holding up, the number who elect the "power option," and especially the number who are interested in utility operations, is steadily declining. Those contacted were unanimous in stating that "the major Western utilities do not have a definite recruiting policy comparable to that of the large manufacturing industries." Faculty men feel that utilities appear to have fallen behind in the recruiting of engineers, that they recruit few men and then only occasionally, at times of need. Only one Western utility was mentioned consistently as doing a recruiting job. (This company says that it has only expanded its program seriously within the past year or two to include universities outside of its own territory.)

One school of engineering reports that 78 companies looking for electrical engineers have already scheduled 1953-1954 visits; among these only two public utility companies are represented! "Equipment manufacturers seem to be meeting competitive trends, while utilities have failed to carry on aggressive and continuous recruiting" is the comment.

In none of the groups contacted—utility, faculty, manufacturer or consultant—was there any disagreement on the need for more engineers. Nor do any question the existence of engineering challenges that face the power industry or of areas of engineering opportunity that are potentially as glamorous as anything offered by electronics or any other field of engineering.

But it is quite apparent that it is the utilities themselves who are going to have to develop the initiative necessary to acquire the 150 new engineers needed each year. Not only are more vigorous recruiting programs needed to attract current engineering graduates into the utility industry but also longer-range programs to encourage more students to take engineering courses. Over 1,000 new 60-cycle EEs will be needed by utilities in this region between now and 1960. This survey indicates that most of these will have to be actively recruited in competition with other fields and other employers.



Days of time were saved in building transmission line by using helicopter to string the rough ground lines over trees and shrubbery

Helicopter Does the Job in 14 Minutes

To determine effectiveness in reducing time, cost and damage to trees and shrubbery while stringing a transmission line through the new Forest Lawn and Griffith Park areas, the Los Angeles Department of Water & Power used a helicopter to pull through the ground lines. The helicopter landed at the starting point, picked up the rope end and strung and laid the line across the tops of the towers for a distance of approximately 3,600 ft.

Two lines were carried through involving two trips and a total flying time of 14 minutes. This operation would have taken a small crew of men several days to accomplish.

To prevent snagging, the rope was paid out to the helicopter from cans used for the Lyle rope gun. Each can contained 1,800 ft of rope, requiring two for each pull. The whole operation went smoothly and represented a considerable saving in time and money. It is proposed to use the scheme in the future because of the savings involved and maintenance of good public relations resulting from reduced construction time and less damage to shrubs and trees.

Changed Conditions Justify

New Look at Oregon–California Intertie

With the recent announcement by the California Oregon Power Co. that it plans an extensive 230-kv backbone system, the Oregon-California intertie has taken on new interest. Further developments change the picture. In December Copco expected to complete a 62-mile, 230-kv line from Yamsey to Klamath Falls, an extension of a Bonneville 230-kv line terminating at the former point. This will establish a 230-kv line from Klamath Falls north to the Columbia River federal system. There is a new mining load, Nickle Mountain just south of Roseburg, requiring initially between 60,000 and 70,000 kw. This is a BPA customer but will be served over facilities of Copco on an interchange basis. If Copco receives permits for developments on the Klamath and McCloud, for which FPC applications are pending, there is prospect that Copco will have excess hydro on its system. Pacific Gas and Electric Co. would be interested in this hydro and there is speculation that PG and E would reinforce present interconnections with Copco by a 230-kv line from its Pit River system to Klamath Falls. In that event a 230-kv tie with the Northwest would be established. These developments have brought about a review of the economic benefits of power exchange between the Northwest and California.

Capital and Annual Costs, Proposed 230-kv Ties

Line Designation	Capital Cost	Annual Costs: Federal Financing	Annual Costs: Private Financing
Klamath Falls-Shasta substations*	$6,442,000	$456,170	$ 834,960
Roseburg-Shasta substations*	9,404,000	646,860	1,199,810

* Via Shasta power plant. Includes costs for line and substation facilities necessary to loop into Shasta plant.

FPC Report

The Federal Power Commission has just completed a comprehensive study showing the economic feasibility of a tie between the Northwest and California. If all the assumptions made by FPC can be supported, then, according to the report, the tie is economically justified at this time.

FPC summarizes its findings and conclusions as follows:

1. Power shortage in the Pacific Northwest—In the event that adverse stream flow conditions prevail there will be energy shortages, or extremely narrow margins of surplus, during each of the storage-control months of the period July 1954 through June 1957.

2. Power margins in PSA 46—During this same period there will be substantial power margins in PSA 46 (northern California). Although the major portion of the energy margins is in steam-electric plants and much of it is available only during off-peak hours, it appears that sufficient power could be made available to load two 230-kv interconnections almost continuously during most months, particularly in years of better than adverse flow.

3. Two possible interconnections were studied—The first was a 230-kv line connecting the BPA 230-kv system at Klamath Falls, Ore., with either PG and E system in the Pit-Shasta area of northern California or with the federal 230-kv system at Shasta plant (see accompanying maps). Studies indicated that the capacity of the tie line would be substantially the same whether it terminates at the Pit 3 plant of PG and E, the Shasta plant of the Bureau of Reclamation or the Shasta substation of PG and E. In order to determine the feasibility of the line for the most expensive southern terminal considered, economic studies were based on the assumption that the line would loop into the Shasta plant and terminate at the Shasta substation (recently renamed Cottonwood substation.)

The second possible interconnection studied was a 230-kv tie between the BPA system at Roseburg, Ore., and the PG and E's Shasta substation, with a loop into the Shasta plant of the Bureau of Reclamation.

4. Capacity of the proposed interconnection — Tests were made on BPA's a-c analyzer board to determine the transient stability limits of the proposed lines under various system conditions. These tests established the maximum safe loading on the proposed line, or lines, when operated in conjunction with the existing 125-kv interconnection. Since it is anticipated that there would be significant uncontrollable power swings between these large systems, the maximum capacities determined from the board studies were reduced by 35 mw to obtain the average transfer capacity. The capacities so obtained, which include the capacity of the existing line, were further reduced by 50 mw to obtain the new increase in capacity due to the proposed 230-kv lines. After making these adjustments the capacities under various conditions were found to be: With one 230-kv line, power flow north, winter condition, 75 mw on-peak, 155 mw off-peak; power flow south, summer conditions, 85 mw on-peak, 115 mw off-peak. With two 230-kv lines: power flow north, winter condition, 235 mw on-peak, 395 mw off-peak; power flow south, summer condition, 230 mw on-peak, 285 mw off-peak.

5. Cost of proposed interconnections — The report shows the estimated capital and annual costs of the proposed interconnection for each of the possible southern terminals. The costs considered in determining the economic justification for the proposed interconnection are as shown.

6. Principal benefits of proposed interconnections—The Pacific Northwest system is essentially hydro and, because of the great annual variation in stream flows, there are large amounts of secondary energy available except in low-flow years. In the PG and E system, on the other hand, a high percentage of its capacity is in steam-electric plants. On this system, under typical conditions, there would be considerable off-peak steam energy available, although even in full-water years steam-electric generation is required for base-load operations.

Because of these differences, the systems tend to complement each other and a strong interconnection would result in substantial benefits to both areas. It would make possible the transfer of unusable hydroelectric energy from the Pacific Northwest to PSA 46 for the re-

placement of a corresponding amount of steam-electric generation. During the first 25 years of tie-line operation it is estimated that an annual average of 280,000,000 kwh of unusable hydro energy in the Pacific Northwest could be delivered to PSA 46 load centers if one 230-kv line is installed, and an annual average of 494,000,000 kwh with two lines. The incremental costs that would be saved by utilizing this energy in lieu of steam-electric generation were estimated at 3 mills per kwh. The average annual savings because of steam replacement would be $796,880 for the first line and $893,640 for the second, after making allowances for incremental costs of hydro generation.

The interconnection would make it possible to firm up some of the Pacific Northwest secondary energy by the utilization of steam energy that is unusable under the PSA 46 load curve. It is estimated that with one 230-kv line 58 mw of secondary energy would be firmed up during the first 25 years of operation, and that with two lines it would be possible to increase the firm capacity of the Pacific Northwest by about 158 mw.

The benefits were evaluated as the difference in cost of firming the hydro in the Pacific Northwest by steam energy from PSA 46 (incremental production cost), and the cost of firming the hydro by means of a new steam-electric plant in the Pacific Northwest. The average annual values on this basis were estimated to be $376,000 for the first line and $648,300 additional for the second.

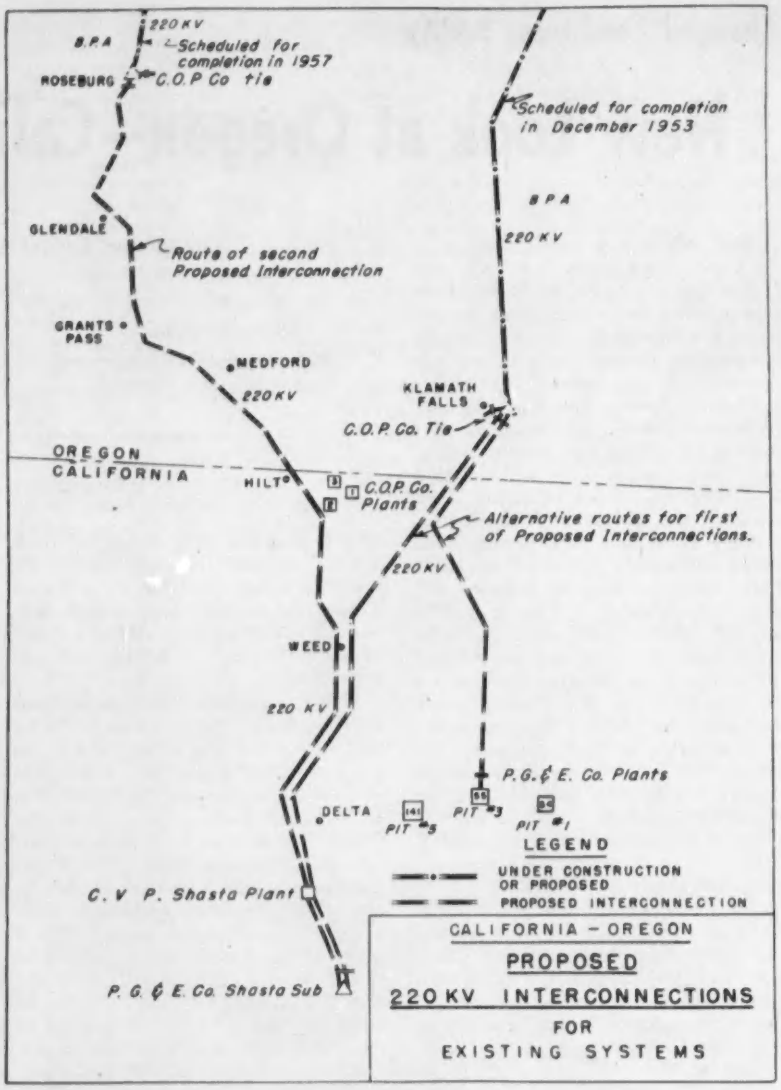
In the event of an adverse year in the Pacific Northwest during the period 1954-57, the proposed interconnections would be of particular value in alleviating the power shortage. It would greatly reduce, if not eliminate, the need for curtailment of both firm and interruptible power. No monetary values were given these benefits although it is recognized they would be substantial.

7. Economic feasibility—The total evaluated benefits and the total costs of the proposed interconnections were compared and it was found that the benefits exceeded the costs by appreciable amounts in all cases. The ratios of benefits to costs, assuming the interconnection would loop into the Shasta power plant and terminate at the Shasta substation, are as follows:

	Private Financing	Federal Financing
For one 230-kv line	1.38/1.00	2.44/1.00
For two 230-kv lines	1.27/1.00	2.29/1.00

8. Changes proposed in California Oregon Power Co. system—When the studies upon which this report is based were nearing completion, Copco announced plans for major changes in its transmission system. According to its plans a 230-kv backbone transmission line would extend throughout the company's service area.

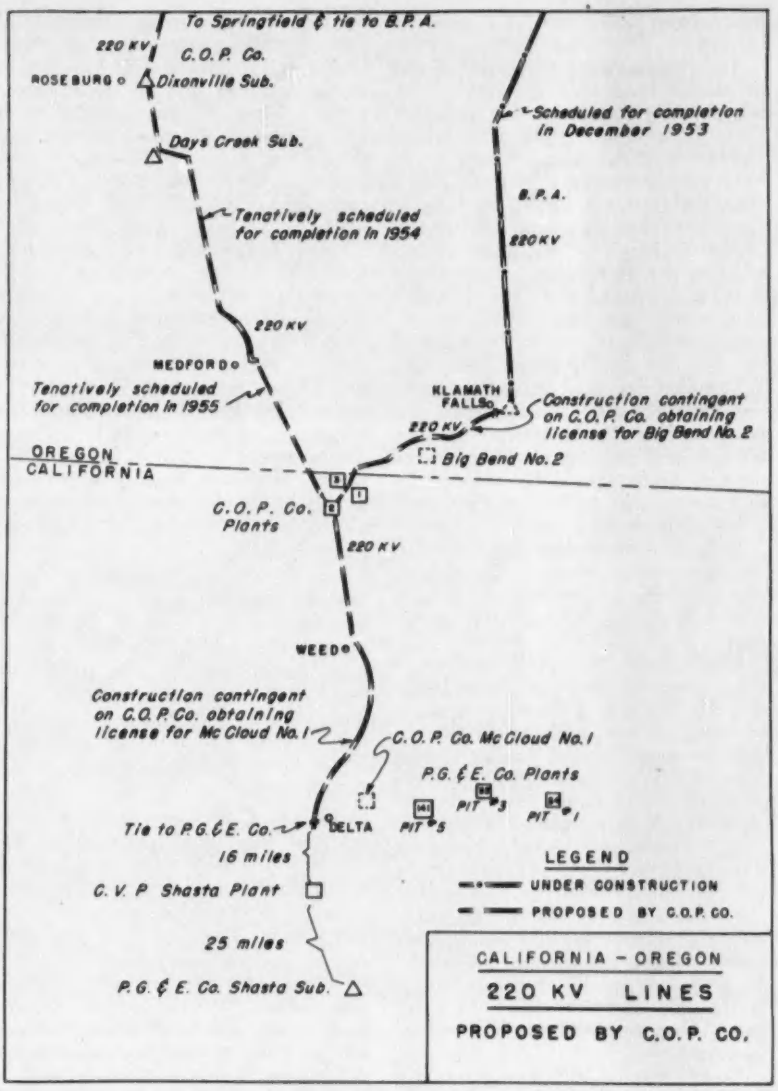
Should these lines be constructed, the second interconnection would be greatly simplified and could be completed by constructing a 230-kv line from the terminus of the Copco's line at Delta, Calif., to the Shasta power plant or the Shasta substation, a maximum distance of about 41 miles.



Cooperative Study

Four interested parties cooperated with FPC in making the study, Bonneville Power Administration, U. S. Bureau of Reclamation, Pacific Gas and Electric Co. and the California Oregon Power Co. The new study was undertaken at the request of the Defense Electric Power Administration in May 1952 to determine the value of the proposed intertie to national defense. It was an outgrowth of initial study made by FPC in 1950.

In selecting routes for the proposed interties, 230-kv lines built or proposed by the participating agencies were taken into consideration. BPA completed a 230-kv line from Maupin, Ore., to Yamsey, 62 miles north of Klamath Falls. Copco completed an



extension of this line to Klamath Falls during December 1953, and will own and operate it. This line is expected to have surplus capacity during the early years of its operation and therefore FPC considered Klamath Falls a logical terminus for one of the ties to California.

Three southern terminals were considered: Shasta power plant of Central Valley Project, Cottonwood substation of PG and E; and the Pit 3 plant of PG and E. The second tie would probably terminate at Roseburg, Ore., southern end of a 230-kv line proposed by BPA and to be completed in 1957. The tie would then extend south to Medford, loop into Shasta power plant and terminate at Cottonwood substation, a distance of approximately 245 miles. It was assumed that H-frame, wood-pole construction with 795,000-cir-mil-ACSR conductor would be used. Series capacitors to provide 35% compensation and tie-line load control equipment were figured in costs.

Comments on Report

The report brought forth comments from the four cooperating agencies. These are summarized as follows:

BPA

The Bonneville Power Administration noted that the original draft of the report submitted to it was quite conservative and that actual operation would show benefits substantially greater than those contemplated in the report; that changes made in the final report would tend to make the results even more conservative; that even so, the interconnection appears to be well justified. The report concludes that a 35-mw margin in its line loading is needed to allow for normal swings, with a 230-kv connection in service between Klamath Falls and the California system. It believes that with the best tie line control equipment available at present a margin of 25 mw would be satisfactory.

USBR

Justification for the additional expense of extending the line south of Shasta power plant has not been presented, USBR noted, and therefore it considers that the study better supports a recommendation that the U. S. Bureau of Reclamation construct a 230-kv tie between its Shasta power plant and BPA's 230-kv system at Klamath Falls. The cost of the line to Shasta power plant would be $1,114,000 less than the cost of the longer line. No additional benefits would be derived by extension of the line to Shasta substation since the capacity of existing lines south of Shasta power plant is fully adequate, USBR believes.

Regarding the finding of feasibility of interconnection, it is of the opinion that the report has been weighted against construction of the interconnection on every item that involved judgment or estimate to the extent that the report does not present a realistic evaluation of the true technical and economic desirability of the interconnection. Listed below are 10 principal items in the report which, according to USBR, have been handled in such an unduly conservative manner that only a portion of the benefits that would actually accrue from the interconnection are brought out in the report: (1) The 50-mw deduction for existing ties is improperly applied; (2) the assumption of 50 mw capacity for existing ties is too great; (3) the application of transient stability criteria to a line exclusively for energy interchange is not supportable; (4) the 35-mw allowance for uncontrollable power swings is too large; (5) only one-half of the band width of the power swings allowance should be deducted instead of the whole band width; (6) all surplus energy available has not been credited; (7) the assumption that after 25 years the benefits of the line will be no greater than operating costs is conservative; (8) the value of emergency steam energy imported into the Northwest is not reflected in the benefit cost ratios given; (9) the three mills used as the value of surplus energy for steam replacement is too small; (10) the actual and real worth of miscellaneous and contingent benefits is not adequately brought out in the report.

Copco

Copco notes that the report takes into consideration the fact that the first proposed 230-kv connection from Klamath Falls to PG and E's Shasta substation would be of doubtful benefit to Copco because a connection between this 230-kv line and the Copco system at Klamath Falls would require that Copco sectionalize, or run the risk of imposing serious overloads on its existing transmission system. This would be particularly true under winter conditions involving power flow northward. Copco could not afford to run the risk of this hazard to its service area to accommodate the power pools to the north and south. Furthermore, operating a sectionalized system would adversely affect Copco's ability to dispose of its surpluses during off-peak periods.

The company has definitely programmed the construction of a 230-kv backbone line from Dixonville to Copco to strengthen its transmission system and make possible the transfer of large blocks of power. It has also definitely programmed with Bonneville to extend Copco's 230-kv backbone line north from Dixonville to Elkhead to connect with Bonneville's 230-kv line south from Alvey for the purpose of jointly serving the proposed Nickel Mountain load. The construction of this line south of Copco, and from Copco to Klamath Falls, depends upon the construction of the proposed Klamath River and McCloud hydroelectric plants, applications for which are pending before the FPC. The company has been informed that PG and E is willing to construct a 230-kv line to Delta or to some other point to be agreed upon. Upon completion of this line from Alvey to PG and E's Shasta substation, it believes that sufficient interchange capacity would be provided to transfer between the Northwest and Southwest pools the capacity and energy available in these two pools indicated in the recent a-c board studies.

PG and E

In determining transient stability limits, engineers feel that more conditions should have been investigated. Even though the proposed tie would be used only for energy transfer, it is important that it should be as dependable as possible and not subject to frequent interruptions. Such interruptions would adversely affect customer service or would require an increase in system reserve to allow for loss of the tie as well as for other outages that might occur. This would result in more steam generation than the minimum steam which otherwise must be carried.

The steady-state power limit of the tie should have been determined for all operating conditions. There is possibility that the higher synchronous reactances of the machines may result in a steady-state power limit lower than the transient limit found using the lower transient reactances and the minor faults. The effect of Copco tripping the tie requires investigation. A study may well show the necessity of normally operating the Copco system separated at one or more points between Klamath Falls and PG and E. Engineering and operating staffs are convinced that the allowance for power swings should not be less than 50 mw and the figures of transient stability limits should be reduced by that amount in estimating the capability of proposed lines.

Estimates of power transfers are overly optimistic because they do not give adequate recognition to transmission and other limitations in California.

One of the two major economic benefits described in the report is the saving in the cost of firming secondary hydro energy available in the Northwest by supplying the firming energy from California steam plants instead of from steam plants located in the Northwest. The company understands that the estimated saving is based on the assumption that California plants will be available and that the firming energy can be generated on an incremental cost basis, but that steam plants would have to be constructed in the Northwest to provide the same service and would therefore have to carry fixed charges as well as the cost of operation.

Cost of firming 50% time secondary hydro from steam plants in the Northwest is estimated in the report to be 3.74 mills per kwh, which the company interprets to mean that the total cost of steam generated energy itself is 7.5 mills. For the Northwest to realize any benefit at all, steam power produced in California would have to be delivered in the Northwest for less than 7.5 mills per kwh and the report, in appraising benefits, assumes that it could be done for six mills. Based on existing interchange contracts, the price for such delivered power, even if generated in efficient steam plants, probably would show no saving over the 7.5-mill cost of generation in the Northwest. The price charged for power delivered to Copco for transfer to the north was considerably higher. "It is our opinion there is no sound basis for assuming that there would be a financial benefit to the Northwest from this source. Moreover, firming with steam plants in the Northwest would provide greater assurance of continuity of service."

In the company's opinion a sound business analysis would call for a substantial amount of surplus Northwest power to be made available for transport to California for a period of years on a reasonably assured basis and at a price sufficiently less than the cost of alternative power to justify construction of additional transmission facilities. However, as matters stand, no negotiations have been entered into nor have any been proposed between the parties who would make available and receive the power to be transferred over the proposed interconnection. The practical feasibility of the project would be entirely dependent upon the outcome of such negotiations. "We believe that the report clearly sets forth the major factors of a highly complex problem involving conflicting opinions, as well as the vagaries of long-range plans and forecasts but that the appraisal of benefits is overoptimistic."

New Power Line Patrol and Fault Locator

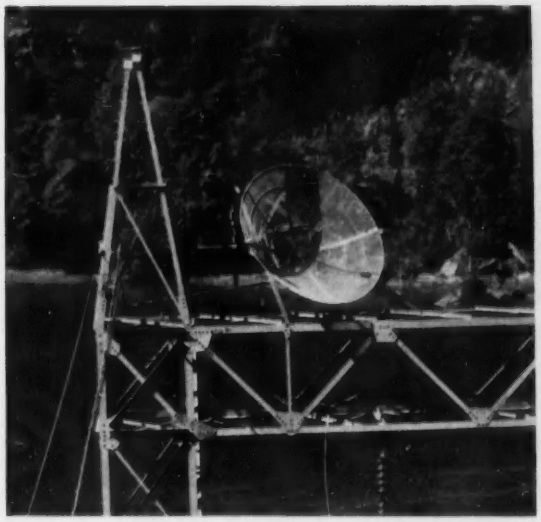
Electronic equipment that will instantly indicate the location of transmission line faults within plus or minus 1,000 ft has been announced by Risco of San Francisco. The equipment is always connected to the line and therefore does not require that the line be de-energized to locate a fault, as do other radar-type fault finders.

The new Risco equipment consists of a master station at one end of the line and a slave station at the other end. At the master station there is a 100-kc transmitter, a microsecond counter, a one-megacycle temperature-controlled crystal oscillator and a fault receiver. At the slave station there is a similar counter, crystal controlled oscillator and fault receiver, and a 100-kc synchronizing unit.

The equipment is connected to the transmission line by means of standard high-voltage coupling capacitors. When a flashover occurs on the line both a visual and an audible alarm are given.

Field tests will be reported soon by ELECTRICAL WEST.

Helicopter was great time saver in transporting material to reflector sites. Right: Microwave reflector at Gorge end of channel



Existing high-tension bus structures were used successfully for 10-ft parabolic microwave antennas at Gorge and Diablo plants

Not too Tough for Microwave

Microwave system with "three-cushion" bounce between two isolated hydro plants provides adequate and dependable facilities at minimum cost. Helicopter transport used

R. A. Benson

Communications Supervisor
Seattle City Light

Postwar expansion of Seattle City Light's generating, transmission and distribution facilities forcefully indicated that existing communications facilities were inadequate and must be modernized and expanded.

Maximum dependability under the most adverse conditions was established as a prime essential in the program of modernization. Work started in 1949 and now nears completion.

One interesting problem in this program was the replacing of six miles of five-circuit, open-wire telephone lead and four carrier circuits superimposed thereon, with a microwave circuit between the Gorge and Diablo power plants. Annual maintenance costs were high because of severe snow-slide damage almost every winter; poles and arms were due for replacement after 24 years of service. Further, a higher degree of dependability of facilities must be provided. These were the determining factors that finally led to microwave as the logical solution. All conceivable methods to do this job were investigated for the one that would be the most economical and still provide a very high standard of performance and dependability.

Reflectors Repaired

A practical line of sight operation between antennas located at the two power plants was impossible because of rugged terrain (see map and photographs). Survey crews determined that by locating large reflectors at considerable distance and at higher

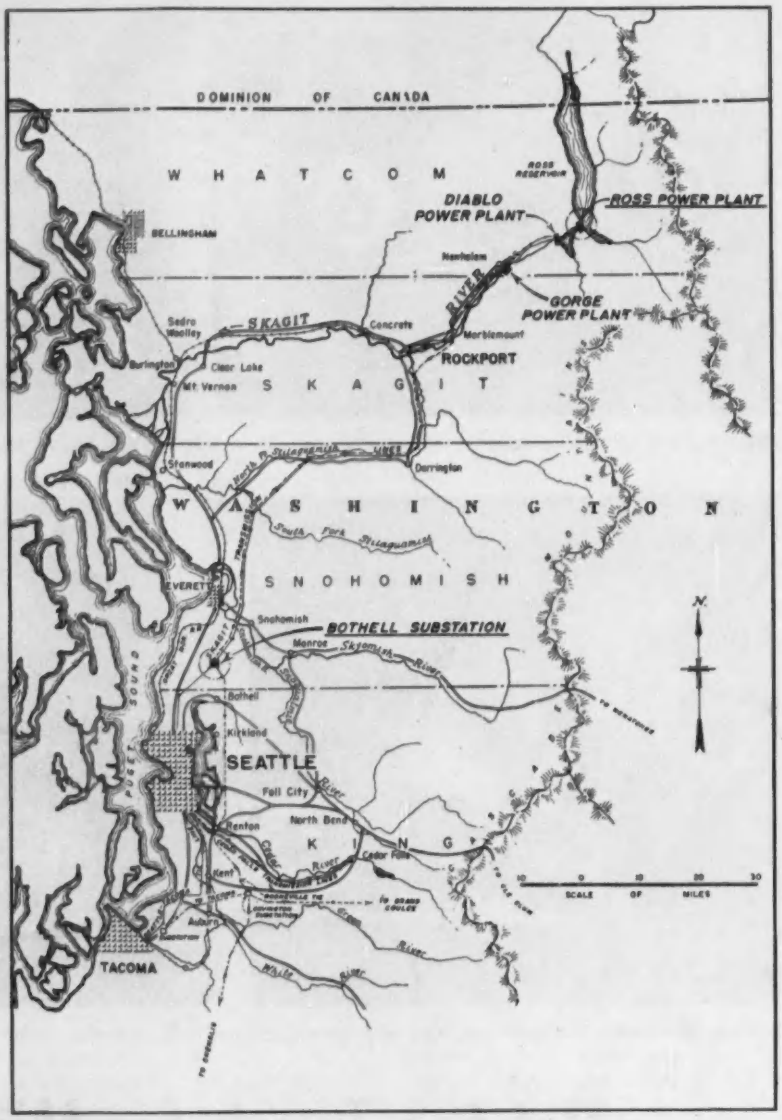
elevation than the 10-ft parabolic antennas at each end a line of sight path could be established. Application of microwave to this type of "three-cushion" operation was most unusual. To the city's knowledge there are no similar systems in service anywhere.

Prior to determining the type of equipment, reflector size, antenna size, etc., it was definitely established that the circuit must provide a minimum fade margin of 15 decibels. That meant that reduction from normal signal levels of 15 db could be experienced before a noticeable deterioration of signal level and quality of voice transmission would be detected.

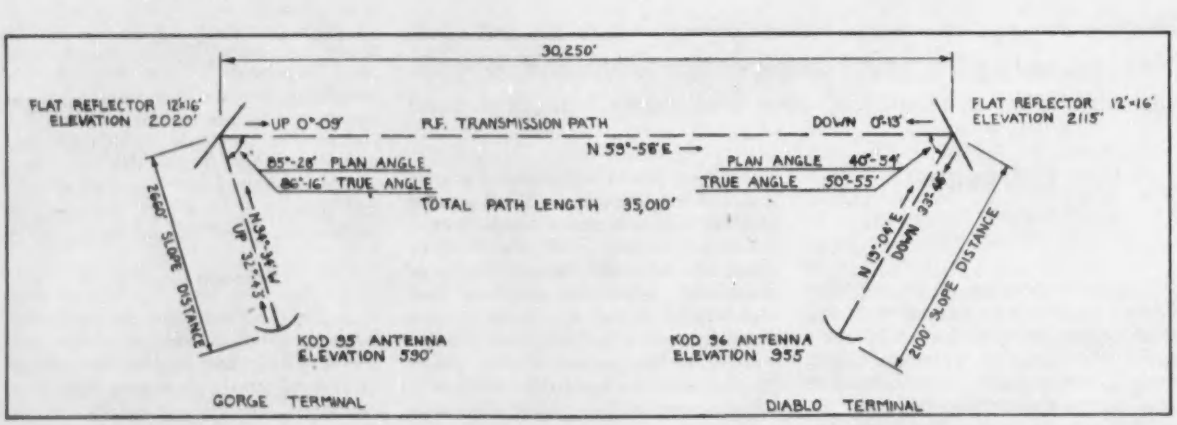
The reflectors were designed sufficiently large so that the calculated normal circuit loss was 92 db. Since the microwave equipment manufacturer rated its system for a maximum loss of 110 db, there remained a calculated fading margin of 18 db. By actual measurement, after the circuit was installed, the fading margin turned out to be 17 db. This satisfied requirements.

Basic considerations in the design of the reflectors were: (1) to provide a reflecting surface of sufficient size and flatness; (2) to mount it securely enough to withstand 100-mph winds; (3) to have the reflector orientation adjustable; and (4) to design the assembly so that it could be transported readily to the erection site while disassembled. To meet these requirements a reflecting surface was made of ⅛-in. sheet aluminum in identical sizes of 3x4 ft. These were fastened to aluminum structural members with flathead aluminum screws. In the construction of the reflector face and its structural frame 61S-T6 aluminum was used so that thermal warping of the surface would not occur. The required degree of flatness is within one-tenth of a wave length or about ½ in.

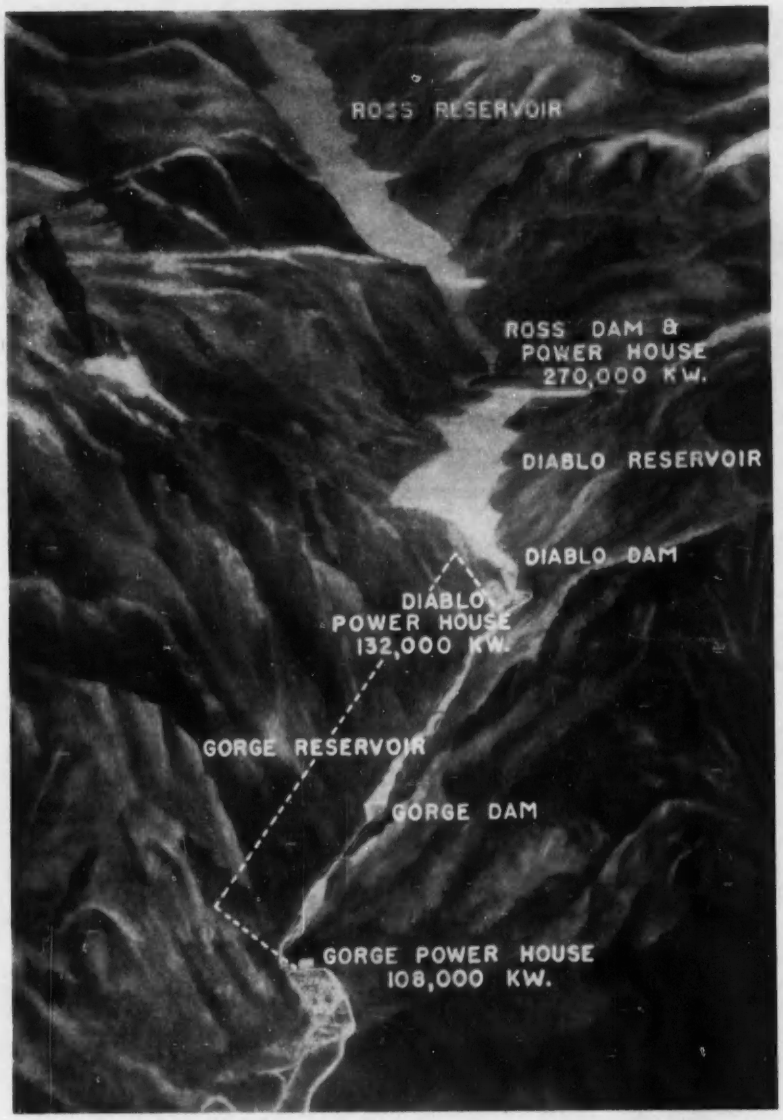
The support tower for the reflector



Location map for Skagit project of Seattle City Light. Microwave channel is indicated



Schematic diagram of Gorge-Diablo microwave radio channel showing position of antennas, reflectors and giving transmission path



"Three-cushion" microwave bounce up rugged Skagit River canyon is only one of its kind

is a steel structure 25 ft high and 7½ ft square at the base. The reflector itself, which is 12 ft high by 16 ft wide, is mounted on the front of the support structure by a turnbuckle arrangement. This allows its orientation to be varied plus or minus 5° from the center position.

All materials for the structures were carried to the reflector sites by helicopter. The actual flying time required to transport the material for both reflectors was 1½ hours. This method resulted in a tremendous saving in man-days of hard work. The Gorge reflector location, as one example, could be reached only after a hazardous two-hour climb that would have made the transporting of materials extremely difficult.

Installation of the Gorge - Diablo microwave was governed by two major considerations, namely, circuit performance and convenience in maintenance. High system performance indicated that the antenna leads should be short, whereas ease of maintenance called for the rf equipment to be grouped in the same room with other communication facilities that were located at a considerable distance from the antenna locations. It was decided to group equipment even though it meant an additional 4 db of loss because of the long leads to the antennas.

In order to reduce losses as much as possible 10-ft parabolic antennas were used instead of the more conventional 6-ft size; 1⅝-in. coaxial transmission line to the antennas was used instead of the customary seven-eighths size. At both locations existing steel substation structures were utilized for the antenna mounts. These are proving entirely satisfactory.

Microwave Equipment

The microwave equipment, manufactured by the Federal Telephone and Radio Corp., uses the pulse time division type of modulation. It is capable of providing 23 voice channels. The initial installation provides for 10 voice channels, leaving a substantial number of channels available for pilot relaying, telemetering and other uses at a very low cost per circuit.

The transmitter, receiver and some of the other items of equipment are furnished in duplicate. An automatic transfer circuit switches the stand-by units into operation in the event of failure of the normally operating units. This arrangement permits maintenance without interrupting service to any channel except the one being worked on. Several alarm circuits are provided to indicate blown fuses or the transfer of any of the duplicated equipment to the stand-by units.

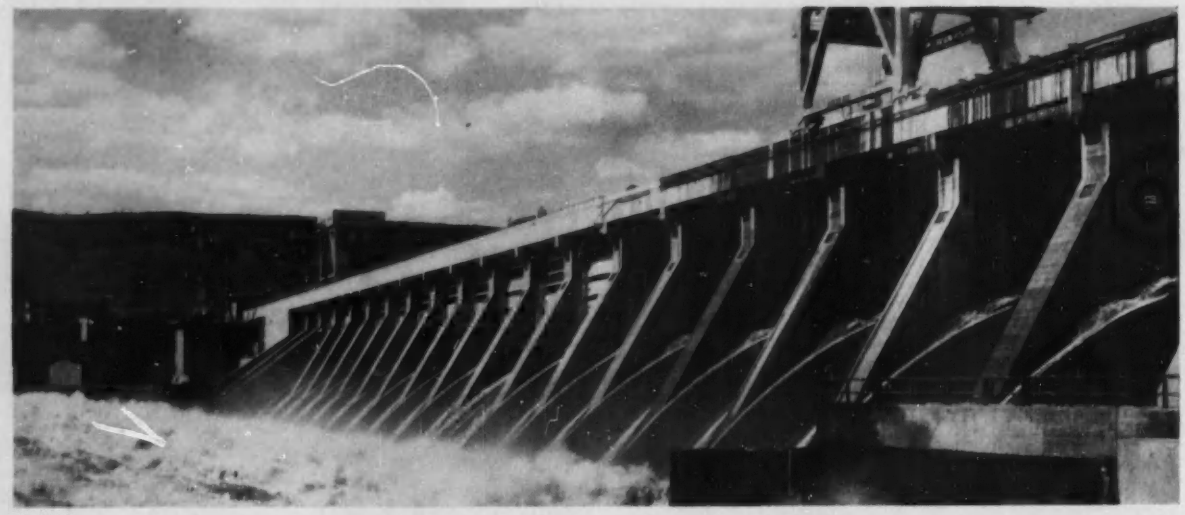
The two frequencies assigned to this channel are 1,860 mc and 1,980 mc, with a receiver band width of 8 mc at the 3-db points. Transmitters have an average input of 20 w.

Dependability Improved

After a few months of operation several changes were made to improve dependability and reduce maintenance costs. Autotransformers with 2½% taps for adjustment of all filament supply voltages were installed. All heater-type filament voltages were adjusted to between 5.8 and 6.1 v. Automatic induction voltage regulators were installed where supply voltages varied more than plus or minus 2½%. Tube life increased by a factor of approximately three to one.

Because of several instances of tube failure in the stand-by equipment upon an automatic switchover from the normal equipment, wiring changes were made that provided a completely dead stand-by, energized only upon failure of the normal equipment. Many tests indicated that normal talking and signaling could be obtained consistently within 1½ minutes from a cold start. Dependability and tube life were very materially improved.

After a year's operating experience, considering the problems in training personnel and the equipment changes made to improve dependability and reduce maintenance costs. Seattle City Light is more than satisfied that microwave has proved itself in solving a tough communication problem.



McNary Dam from Washington shore showing power house on far side and leaf gates of spillway. Capacity of spillway, 2,200,000 cfs

First McNary Power Goes on the Line

Units will follow in pairs until ultimate plant capacity of 980,000 kw is reached

Colonel F. S. Tandy
District Engineer, Walla Walla, Wash.
Corps of Engineers, U. S. Army

On Nov. 6, 1953, a full 30 days ahead of schedule, the first power to be generated at McNary Dam on the Columbia River was fed into the Bonneville Power Administration's transmission lines near Umatilla, Ore. This first 70,000-kw generator to begin feeding its much-needed energy into the Northwest power grid is the largest of its type ever built. Installation of 13 additional similar units will follow, one scheduled for every 90 days hereafter until the plant's full capacity of 980,000 kw is reached late in 1956.

McNary's first generator went into commission at a time when the winter peak load was just materializing and when a power shortage in the region could become a reality. With a second unit scheduled for completion before the close of 1953, some temporary relief at least is in sight to the ever-encroaching electrical power demands of the fast-growing Columbia River Basin.

McNary Project

McNary navigation lock and dam, as it is officially designated on the Corps of Engineers' records and reports, is a $286,000,000 navigation project with power generating equipment and constitutes another unit of the main control plan for the comprehensive development of the Columbia River and its tributaries. Located 292 miles upstream from the mouth of the Columbia River and three miles above the mouth of the Umatilla River, McNary Dam was designed and constructed under the supervision of the Walla Walla District Office of the U. S. Army Corps of Engineers.

The project includes a dam, power plant, navigation lock and appurtenant facilities for purposes of navigation and power development. Ample fish passage facilities along both shores of the river are included in the project, and the creation of a 64-mile-long pool behind the dam not only improves navigation upstream but provides untold recreational potentialities and wild-life sanctuaries as well as river harbors and dock sites inviting to inland water transportation.

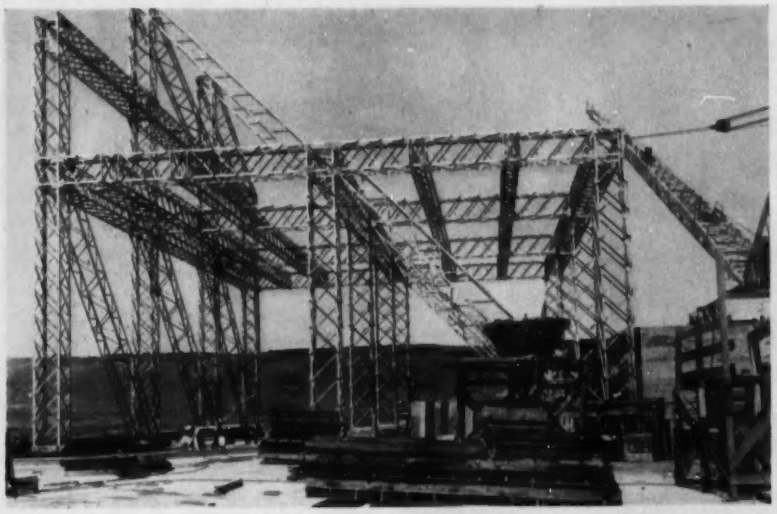
McNary Dam was started in October 1947 with the building of a huge horseshoe-shaped cofferdam jutting out from the Washington or north shore of the Columbia to enclose the area wherein the navigation lock, fish passage facilities, and 13 spillway bays were to be located. The cofferdam consisted of two rock-fill shore arms made watertight by an impervious silt blanket on the river side and a row of circular steel cells filled with sand and gravel on the up-river leg.

In building these steel cells of the cofferdam, circular sheet steel templates were placed in location; straight webbed steel sheet pile was racked up; and closure piling was placed, the steel piling being driven to bedrock. Each cell was then filled with sand and gravel. With the cofferdam completed and unwatering started, construction of the navigation locks, fish ladders and spillways was begun.

In September 1949 with the work on the Washington or north bank well along a similar cofferdam was begun on the Oregon shore of the river. By January 1950 this cofferdam was completed to the extent that unwatering was possible, and excavation for the power house and turbine bays to be located on the Oregon or south shore, including a portion of the Oregon shore abutment embankment, was started.

The third stage of construction at McNary involved the building of a second-step cofferdam that would connect the two up-river legs of the Washington and Oregon shore cofferdams and bring about closure of the river flow into the controllable channels of the completed spillways.

It was the closing of this 240-ft section between the steel cell cofferdams



Structure on top of dam for 230-kv take-off and single power bank for first two units

on either shore that presented the true engineering problem to the Corps of Engineers. The river at this point had a flow of 126,000 cfs with an average channel depth across the 240-ft open section of 60 ft.

The Army Engineers' answer to the problem was the processing of hundreds of 12-ton precast concrete tetrahedrons and a closure plan that would be a "first" in engineering history. On Oct. 10, 1950, the task of sliding the first of these tetrahedrons from the cable skip into the 12-fps current began. Augmented by 230 tons of "B" rock dumped at the up-river joint of the dam with the steel cofferdam cells, 437 of the tetrahedrons were placed before an undercutting by the current of a sheet piling cell on the Washington shore necessitated a halt. A few days later, however, work was resumed and within the 60 days scheduled for completion the task of diverting the Columbia River into a controlled spillway channel was accomplished.

Closing this river gap served two effects. It allowed for the raising of the pool behind the dam to a level sufficient to place in operation the navigation locks. It also made necessary the construction of a temporary fish ladder facility to meet the upstream migration of the fish after this final closure. A slack-water pool extending some 10 miles upstream was formed almost immediately behind the dam.

Work on the power house structure and the remaining nine bays of the spillway, the Oregon shore fish ladder, raising of the concrete monoliths between the Washington spillway bays to final height and installation of spillway gates and upstream miter gates in the navigation channel all proceeded on schedule with the actual structural work on the dam being 97% complete by the close of 1953.

The remaining work to bring the dam to its full completion is the installation of 12 additional power units and the final construction of transformer towers and feeder lines. As of Dec. 6, 1953, all construction work on the dam proper was completed to the extent that the waters of the pool behind McNary were lifted to the maximum elevation of 340 ft above sea level and the McNary reservoir filled for the first time.

Lifting of the pool behind McNary to its maximum elevation also allowed for the operation of the navigation lock as designed. This lock is of the single-lift type, the highest single lift in the world (92 ft), and will operate at all flows of the river less than 800,000 cfs. The lock was constructed at a cost of $20,331,000. Its dimensions are: Net clear width of locks, 86 ft; net clear length, 675 ft; vertical lift at extreme low water and normal pool, 92 ft; at minimum annual flow (190,000 cfs), 84.4 ft; at average maximum flow (550,000 cfs), 72 ft 3 in.; depth of meter sill at low water, 12 ft; depth of upper sill at normal 340-ft pool elevation, 20 ft.

Spillway Dam

The spillway dam, located between the navigation lock on the north end of the power house and the power house on the south, consists of 22 bays, each 50 ft by 53 ft, constructed at a cost of $31,120,000. Except for some final work on the hydraulic mechanism of the gate, the spillways are complete.

The spillway dam is 1,310 ft in length with a spillway crest elevation of 291 ft and a deck elevation of 361 ft. Maximum height, foundation to deck, is 158 ft. Type of construction is concrete gravity with concrete apron and baffles for stilling basin.

Maximum spillway capacity at normal pool is 1,480,000 cfs. Maximum spillway capacity at maximum pool is 2,200,000 cfs.

Fish Facilities

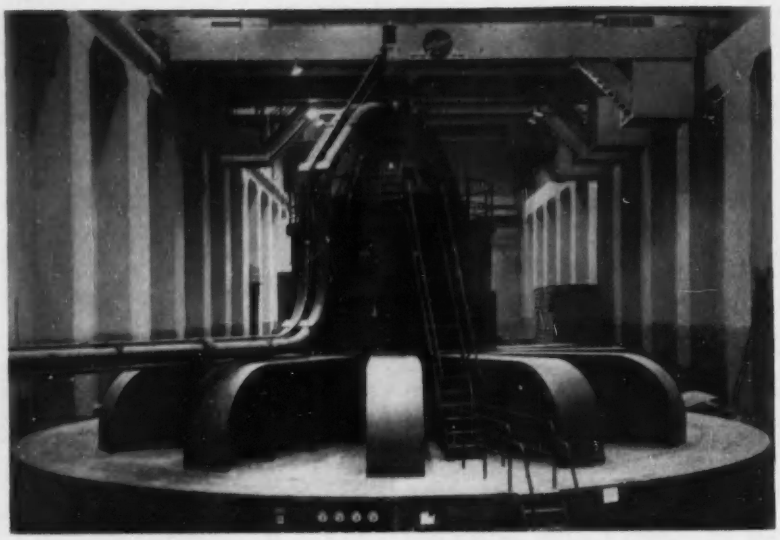
The deck of the dam, in addition to providing tracks for the operation of two spillway cranes, provides a serviceable roadway from shore to shore. The fish passage facilities, which are now operating as designed, consist of two gravity-type ladders 30 ft wide with a slope 1 on 20. One fish ladder is located near each shore. A supplemental lock (elevator type) and one pressure fish lock (experimental type) are additional fish passing facilities. The fish ladder flow from the pool is 180 cfs, augmented by several thousand cfs of fish attraction water provided on the Oregon side by means of a three-unit pumping station with a total capacity of 7,500 cfs.

Attraction water for the Washington shore ladder is provided by a gravity supply fish attraction water station. In addition a fish lock 20 ft by 30 ft is located near the Washington side, and an experimental pressure fish lock is located between the power house and the spillway. A modernly equipped counting station is located at the mouth of each fish ladder, and facilities for accurately charting the upstream migration of anadromous fish are available. The total cost of the fish passage facilities at McNary is $22,491,000.

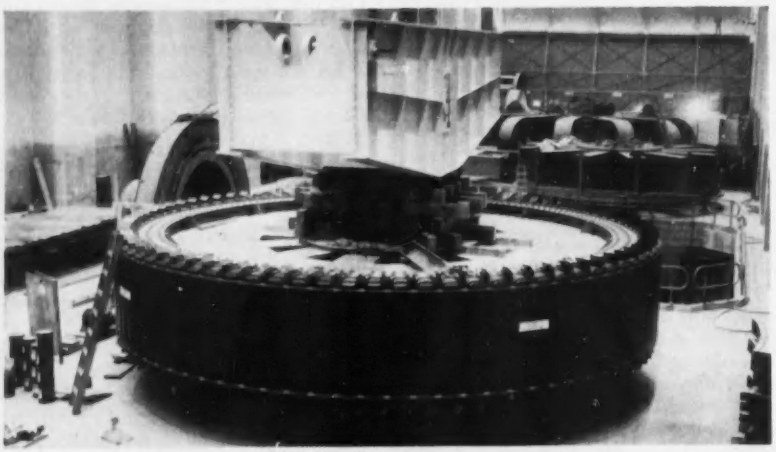
Abutment embankments on the Washington shore measure 1,620 ft in length and on the Oregon shore 2,500 ft in length. The crest elevation of these embankments is 365 ft with a crest width of 30 ft.

At normal pool elevation of 340 ft above sea level the pool behind McNary has an area of 37,900 acres. Necessary relocation and levee construction work consists of 16 miles of levee; 84 miles of relocation of railroads; 24 miles of relocation of highways, 17 in Washington and seven in Oregon; and 20 miles of relocation of county roads.

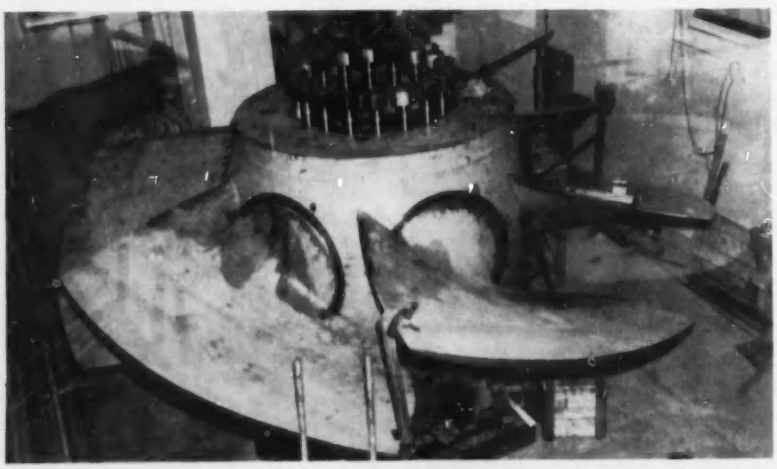
The electrical power generating facilities at McNary are located at the south end of the dam on the Oregon shore. The power house building is 200 ft wide by 1,500 ft long and eventually will house 14 hydroelectric generators rated at 70,000 kw each. The total cost of constructing the power facilities is $143,392,000.



Thrust bearings, believed largest ever built, are designed to carry weight of 4,000,000 lb



On shaft below thrust bearing is supported this rotor of 90,000 kva equivalent generator



Driving the generators are the largest adjustable blade Smith-Kaplan turbines ever built

Turbines-Generators

The generators at McNary will be driven by adjustable - blade Smith - Kaplan propeller - type turbines, each with a rating of 111,300 hp when operating at a normal speed of 85.7 rpm and under an effective head of 80 ft. These turbines are the most powerful adjustable - blade - type turbines ever constructed or in operation in the world. Because of the variation of flow in the Columbia River the turbines are designed for a wide range and head condition and will result in a wide change in turbine tailwater levels. The effective head will vary from a minimum of 65 ft to a maximum of 92 ft. When operating at the minimum effective head of 65 ft the turbines are guaranteed to develop 93,000 hp. When the tailwater level is low because of low river flow, the effective head will increase up to a maximum of 92 ft. Under this condition the turbines will be capable of developing more power than the output capability of the generators.

General Electric Co. has the contract for 12 of the McNary generators, and on the remaining two the contract is still pending. Each generator is rated at 73,684 kva at 95% pf and 13,800 v with a temperature rise not exceeding 60 C. The 32% guaranteed transit reactance required by the U. S. Army Engineers makes these generators equivalent in size to 90,000-kva machines. With a net weight of 2,400,000 lb per unit these units are believed to be the heaviest hydrogenerators ever built.

The mechanical arrangement of the generators includes a thrust bearing located above the rotor and two guide bearings. The thrust bearing is designed to carry over 4,000,000 lb.

Some idea as to the size of these turbine units is obtainable by the following dimensions:

Inlet water passage to each turbine is approximately 86 ft high at the entrance on the reservoir face of the dam and 74 ft wide near the turbine stay ring. Rate of discharge from each turbine is 14,000 cfs. Diameter of the turbine runner is 23 ft 4 in. with an approximate weight of 423,000 lb without shaft.

Each turbine's rotating element weighs approximately 740,000 lb. The maximum hydraulic thrust developed by the turbine at normal speed and under normal head is 1,950,000 lb.

The McNary project is progressing in accordance with the prearranged schedule. Previous slippages in schedule because of the Korean War have been largely overcome. At present it appears that the project may be completed a good three months ahead of schedule.

Lighting and decorative treatment of utility's sales offices exemplify in practice recommendations made to its lighting customers

Sales Offices Serve as Lighting Clinic

Many lighting features long desired by its illuminating engineers have been incorporated in the new sales offices of the Portland General Electric Co. in the Electric building, Portland. The lighting and decorative treatment exemplify in practice the recommendations made to customers and present a live demonstration of such recommendations carried out in practice.

Basic requirements for any good lighting are freedom from high brightness ratios and an adequate level of illumination. Recommendations of the Illuminating Engineering Society for brightness ratios were followed in this respect. This called for a high-reflectance, low-contrast decoration plan.

Area dimensions, symmetry of layout and obstructions resulted in some foot-candle variation. Walls and trim are light grey-green of 65% and 50% rf respectively. Ceilings are random pattern perforated acoustical tile of approximately 80% rf. Floors are of marbleized asphalt tile set in a checkerboard design of four-tile squares with alternate tile red, 12% rf, and light tan, 28% rf. Desks were all refinished to a blond oak, 40% rf, and retopped with Armstrong mist green No. 416 desk-top linoleum, 44% rf.

The warm tones of the floors and blond desks complement the cool light green of the walls to produce a balanced general tone satisfying to both warm and cool tone devotees. A liveness of general atmosphere is further enhanced by the use of the warm-white, rapid-start fluorescent lamps throughout.

In the 12x16-ft elevator lobby, Day-Brite Plexaline two-lamp ceiling units were used, two 8-ft (four 40-w) and two 4-ft (two 40-w), equipped with Holophane low-brightness lenses and forming a 6x10-ft rectangle with incandescent accent lens units at the four corners. This resulted in a lighting level of 80 f-c maintained.

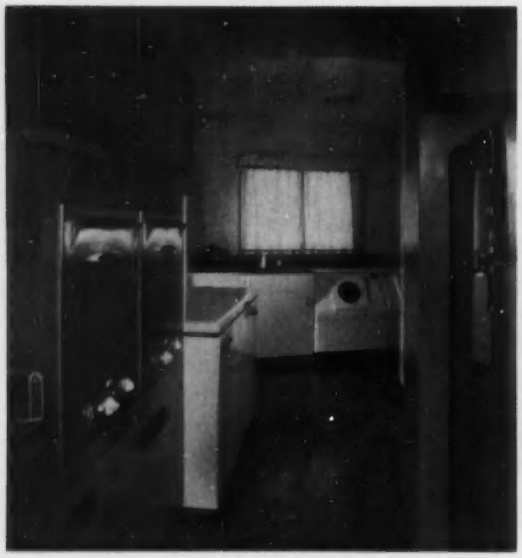
Lighting fixtures in the general office area are of two popular types: louvered direct-indirect in one wing of the L-shaped area and luminous-indirect in the other. Curtis No. 4063 direct-indirect units in continuous rows 6½ ft apart produced a maintained level of 100 f-c in the Alder Street wing. Wakefield Star luminous-indirect units in the other wing in continuous rows 7½ ft apart produced a maintained level of 75 f-c.

It was realized that the lighting levels in the two wings would vary in this general ratio but room dimensions, layout symmetry and obstructions dictated spacing and number of fixtures. The type of fixtures in the two wings could have been reversed to provide a more nearly equal illumination level. However, it was felt that direct-indirect units would look best adjacent to the elevator lobby area with its surface-mounted lens units. From a point at the juncture of the two wings, the observer can view the two different types of fixtures and from his own impression can determine a preference.

In the eight private offices installation of various fixtures was made to provide samples of several manufacturers' products. Luminous-indirect fixtures include: Allbright Californian (four 40-w); Sylvania CP-442 (four 40-w); Columbia SPI-M-I (four 40-w); and Allbright Constellaire with Albolite glass-bottom panels (four 40-w). Direct-indirect units are: Day-Brite Luvex (two 40-w); Smithcraft Director (four 40-w); Sunbeam L1784 (four 40-w); and Glove KPB 44-40 (four 40-w). The maintained illumination values in the private offices varied from 90 to 100 f-c on the desks.

In the 40-ft corridor leading to the future conference room, there will be installed two 16-ft assemblies of single-lamp Day-Brite louvered strip lighting units. The new 38x18-ft conference room will be lighted to a minimum 30 f-c level with silver bowl incandescent indirect units.

Much favorable comment has been elicited from customers, friends and business associates. Electrical contractors and others have been invited to come in and view the new offices with the different types of fixtures and different layouts and to bring their prospective customers. Small cards have been printed and clipped above the switchplates in each room noting the make of fixture, number and type of lamps and the resulting foot-candle level. A brochure was assembled and made available at the receptionist's desk in which illustrations of the several makes of fixtures are shown with accompanying distribution curves and data. This brochure is used as a guidebook in conducting tours of interested customers, architects and builders.



All-electric kitchen features two built-in electric ovens (left) and four built-in hot plates and grill located near the sink (right)

Out Went Gas in All-Electric Switch

A complete switch was made by Joseph Giovran when he built a new house recently in Santa Barbara. The switch was complete from gas to electric. The former home had gas for everything except lighting. The new home has no gas in it whatever; even the heating is all electric.

Electrical Contractor Bob Murphy installed radiant heating cable in the ceiling to a total of 30 kw for the approximately 3,178 sq ft thus heated. In most cases the heating cable was stapled to the plasterboard on 3-in. centers, although in some places the spacing was 3½ in. and in one instance 2½ in. The contractor calculated to provide from 13.3 w per sq ft to a maximum of 18.7 w per sq ft, the average being around 14.

In addition to the radiant heating, bathroom heaters were installed in each of the two bathrooms.

The kitchen is completely electric with two Thermador built-in ovens, fully automatic. Four surface units with a griddle in the center, near the sink, are located along the wall opposite the ovens. There is also a G-E dishwasher and disposal and an 11-cu-ft, two-door refrigerator, a Harder 20-cu-ft freezer, Westinghouse automatic washer and dryer and two water heaters.

The main service is 400 amp. It was a certified adequately wired home. Architect for the attractive California ranch-type house was Robert Ingall Hoyt.

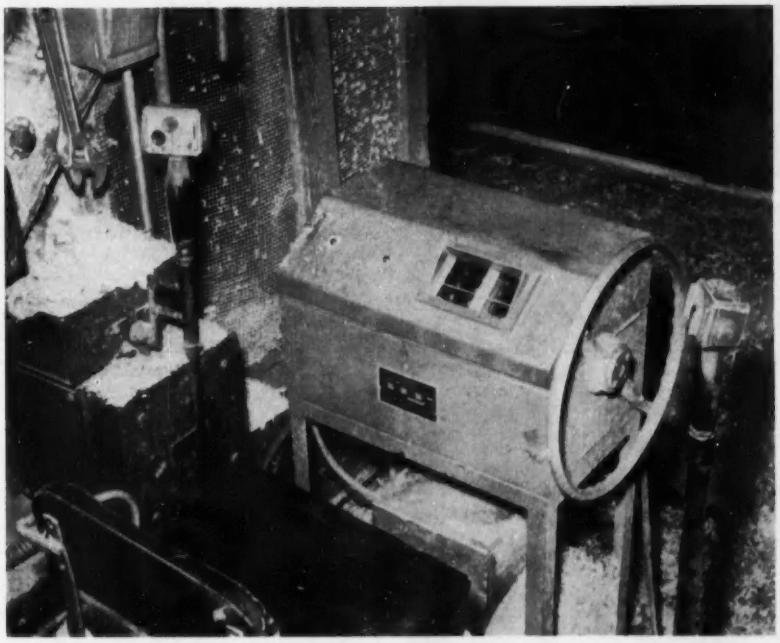
In order to keep from having to use current transformers the contractor used a heavy-duty meter socket and six 50-amp main disconnects without a main switch. Total connected load was approximately 225 amp but with diversity maximum demand was calculated to be approximately 115 amp. Each room is separately controlled with a thermostat so that not all of the heat will be on at any one time in order to control maximum demand.

Radiant heating cable was installed in ceiling totaling 30 kw for heating 3,178 sq ft

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 93

SUBJECT: Remote Control Electric Selsyn Setter for Log Carriage
CUSTOMER: P. Hammer Jr., Stave Falls, B. C.
TYPE OF BUSINESS: Sawmill
SERVICE COMPANY: B. C. Electric Co. Ltd.
DATA SHEET PREPARED BY: R. W. Racine, Industrial Representative



Sawyer's view of dials indicating width of cut. Wheel rotates drum of Selsyn control

A remote-controlled, electrically operated Selsyn setter, installed on the log carriage of the P. Hammer Jr. sawmill at Stave Falls, B. C., speeded up the head saw operation so that production was increased 25% and reduced cost by eliminating one man on the carriage. The Selsyn setter gives the sawyer complete sawing control by placing in his hands a tool by which he can reset the log quickly and accurately for the thickness of the next cut after each run of carriage. This eliminates the former method of operation by which a second man, the setter, sat on the carriage and manually set the log for the thickness of the cut.

Basically a Selsyn set consists of two similar motors (in this case one at the control in front of the sawyer and one on the carriage) electrically interconnected so that, when the armature of the control Selsyn is rotated X°, the slave Selsyn on the carriage rotates X°—this action is instantaneous. The Selsyn's operation may be compared to the rotation of a ship's rudder by the rotation of the helm. The ship's interconnection is mechanical — the Selsyn's, electrical.

Operating Unit

The operating unit of the setter consists of a 10-hp, 406-v motor driving a gear reducer through three v-belts. The gear reducer, in turn, powers through a chain drive the back-and-forth motion of the carriage carrying the log. The output end of the gear reducer is connected also by a chain drive to the output of the slave Selsyn. Thus the number of turns that the output shaft of the gear reducer can make is limited by the position of the slave Selsyn. The shaft of the 10-hp driving motor extends to a brake that is operated by a d-c solenoid coil. As soon as the carriage is in the desired position and when the sawyer releases the push button energizing the driving motor the solenoid pulls the brake and locks the shaft of the driving motor so that the carriage cannot move from its setting. The motors on the carriage are fed by cables sliding along a guy wire.

After each cutting run of the carriage the sawyer turns the wheel controlling the position of the control Selsyn with his left hand. This Selsyn is direct connected to a drum dial that indicates the exact thickness of the next cut. After the cut is selected the sawyer presses the push-button switch in his right hand (or another switch near his left hand) to energize the driving motor on the carriage. The driving motor then rotates until it is stopped by the slave Selsyn, as described in the previous paragraph. When the setting is completed the brake locks the carriage in position for the cutting run.

The installation cost $4,000. Energy consumption is estimated at 0.3 kwh per 1,000 fbm. Hammer is particularly well pleased with this setter. He claims it has increased output, decreased cost by eliminating one man on the carriage. Also it is more accurate.

Electric utilities are interested in the development and application of these Selsyn setters, mainly because they increase a mill's efficiency and hence its load factor and consumption. Both tend to provide a more desirable load. For example, the Selsyn setter in Hammer's mill has increased the cut by 25% or 125,000 fbm per month. This means the sawmill's consumption was increased by approximately 10,000 kwh per month—without any appreciable increase in maximum demand.

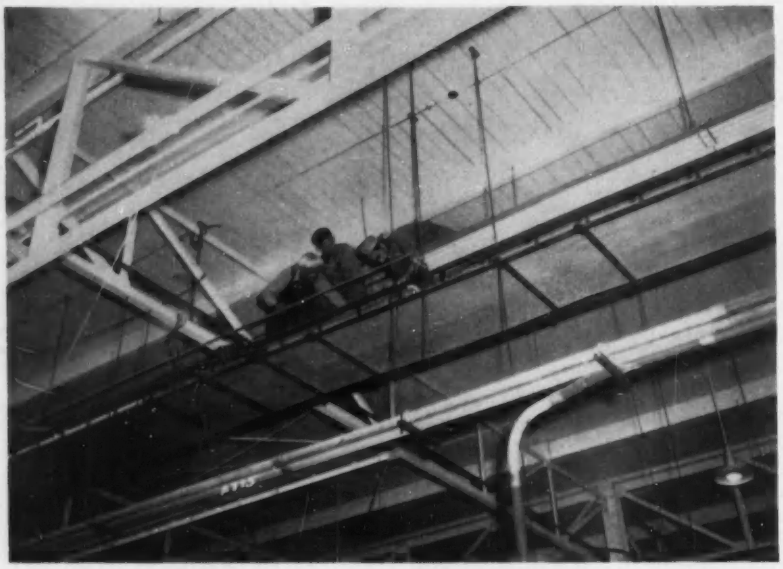
List of Electrical Equipment

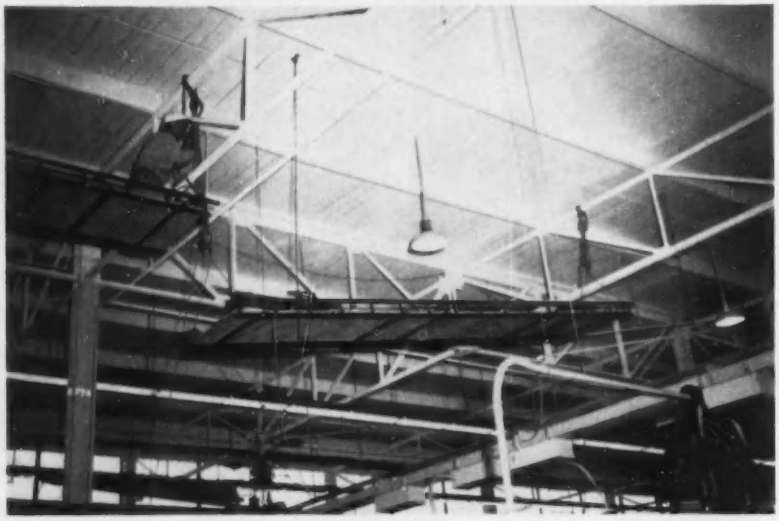
One 10/5-hp, 440-v, three-phase, 60-cycle, 1,705/865-rpm type KG CGE induction motor driving the gear reducer.

One 40/1 Radicon gear reducer.

Two 3ª, 115-v, a-c, 180-rpm Wagner motor.

One d-c solenoid operated brake.





"Leapfrog" to Relight Hiller

"If you can give us 50 foot-candles without interfering with production, you have yourself a job," was the challenge laid down by Hiller Helicopters at Palo Alto to the electrical design and construction contractors, Schwartz and Lindheim of Oakland.

The plant was originally lighted by single incandescent RLM units. The lighting intensity was from 8 to 12 f-c in the 18,400 sq ft production area, that included a machine tool shop as well as 18,000 sq ft of storage area being converted to production. The need for better lighting was realized by the Hiller firm, particularly during the evening shift and during dark days.

However the company was concerned over the cost of interruptions in production, cognizant of the need for round-the-clock production to supply enough helicopters for Korea. The executives therefore stipulated that any relighting must be accomplished with a minimum or no interruption of production.

To meet this directive the contractors made up 180 ft of special scaffolding in sections with which to span between the lower cords of the trusses. On this scaffold or catwalk the electricians could work above the production area from one end of the building to the other. Thus the incandescent units were replaced with two- and three-lamp Sylvania slimline industrial RLM fixtures. The top photo shows electricians working from the catwalk installing the fluorescent units. The old units can be seen too.

After each line was installed the 20-ft sections of scaffolding were swung into position across the building and coupled to the trusses to permit the next line of fixtures to be hung. The center photo shows the "leapfrog" of one section over the production area to its new position. Bottom photo shows the scaffold at the last position when the plant was completely relighted. It was accomplished within one month without stoppage or interruption of production. Present light level is now 50 f-c.

Jack McKittrick, industrial engineer at Hiller, wrote that the foremen reported reduced rejects and increased production after the improved lighting was installed. "Your unique scaffolding methods," he wrote, "caused us negligible interruption in production. Conventional scaffolding would have caused serious delay—a major factor in an operating plant."

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

No gloom necessary

It won't be as bad in 1954 as it may look right now, in midwinter and after a gradual decline in construction in 1953. To be sure it will not be a war boom year but most signs read a good going rate of new construction and an increase in remodeling and modernizing. The latter is of more importance to the average contractor than the big jobs they never get in on anyway. The worst hazard is desperation competition that slashes the margin to bankruptcy. Higher labor and welfare costs cannot all be absorbed where there is no margin.

Credit help

Residential construction, that went pretty sour when terms and interest rates were increased, may get another boost by the loosening of credit for low-bracket homes. Migration is still Westward and there is a shortage of housing even though many high priced homes are slow selling. Lower down payments and long terms are in sight. It could put life back into house wiring and wiring materials.

Headaches ahead

This may be a year of gripes, however. With time on their hands, costing them wages for nonproductive labor, jobs hard to get and going to price-cutting competitors, other costs increasing and volume low, it will be hard even for the smartest contractors to "hold their good men." (If the good men had thought as hard as to how to help their bosses hold more business and customers, times would be better for both.) All of this may well cause short tempers, looking for others to blame, complaints that the associations "ought to do something," generate foolish schemes to "control" competition and other emotional troubles this year. It may well be a shakedown period. Those on solid business ground will survive the tremors. Salvation is an individual matter.

Nonproductive effort

Negotiations don't build any new business. Instead they consume both time and money. During the past several years association managers have had to spend almost their entire energies on negotiations. The committeemen, officers and directors have consumed countless hours defending themselves and the members from increasing demands. There have been trips to the Council. None of this time or expense has created a bit of new business. Only this last year has any money been put into business development and advertising. Much more and at the local level will have to be done to create a little of the wealth that there has been so much effort devoted to sharing.

No change wanted

All of the amendments to change the dues in any way were voted down at the National Electrical Contractors Assn. convention at Miami Beach in November, which indicates the temper of the times. The proposals had been made in a sincere effort to equalize the cost of the association on a basis of services rendered. This would have reduced those of the big jobs to keep them competitive with nonmembers, held the same for the very small contractors but increased them for the middle group. But all were voted down. Even one to reduce all dues was voted down. It was a vote of annoyance and not of reason.

Offer terms

Worth watching for results is a program the Cincinnati Gas & Electric and Union Light, Gas and Power Co. has offered electrical contractors in an effort to build up more wiring business. Customers are offered time payments put on with their electric bill to cover the cost of rewiring old homes, the utilities buying the contract from the contractor and carrying the paper over three years.

Alert the state

Federal Trade Commission says that on intrastate cases reaching it over which it has no jurisdiction it will urge state authorities to act on them under state antimonopoly and trade practice laws.

TV makes suggestions

The TV spot campaign of Northern California Electrical Bureau is another business builder that the contractors, union and distributors are using to reach into the home with a wiring and rewiring sales message. It is drawing more requests for the booklet from a daytime showing, interestingly, than from the nighttime placement it has.

New league

Alberta now has an Electric Service League, newly formed, of which J. E. Bagshaw, Canadian Utilities Ltd., Edmonton, is president; Walter Trueman, Hume & Rumble, electrical contractors, Calgary, vice-president; A. Craig, Alberta Electrical Supplies, Edmonton, treasurer; H. L. Stuart, Canada Wire & Cable, Edmonton, secretary. The league will handle adequate wiring standard promotion in the area.

Color red

That color TV may add to already overloaded home circuits was the concern of a merchandising magazine, which pointed out that black and white sets having from 18 to 25 tubes consume about 250 w whereas color sets with 32 to 45 tubes may require 500 w. This is peanuts, however, compared to the demands of a window air conditioning unit with a 3/4- or 1-hp motor. The latter have really caused a wiring bottleneck to be felt throughout the hot-weather areas.

Good for rewiring

An entirely new type of electric outlet of plastic has been introduced by Pass & Seymour Co. to be installed with nonmetallic sheathed cable. It requires no metal box, the cable being terminated within the outlet itself. It is especially adaptable to installation of new circuits of outlets in old homes or to be used with new materials of wall construction, which make conventional box installations difficult. Made of reinforced Bakelite, it cannot rust or corrode. It also fits into narrower walls or baseboards. The new outlets are called U-AD-M duplex outlets, in brown or ivory.

Farm heat

"Supplemental Electric Heat for Farm Buildings" is the subject of a new bulletin of the University of Idaho, College of Agriculture. Like the predecessor leaflets, it gives practical illustrated instructions on the application of various kinds of electric heating equipment for various farm uses. This includes infrared lamps, wall heaters, portable heaters, soil-heating cables, etc.

Match scale

Electricians' pay scale for Santa Clara and San Benito Counties resulting from negotiations of the independent association there were set at $3.12½ until Dec. 31. On Jan. 1 the scale rises to the same level as the Bay Area, which is $3.19½ for journeymen. This includes 4% vacation plan and 7½c per hour for health and welfare.

More fringe

Fringe benefits asked by one union of an electrical manufacturer include an additional day of holiday for each man's own birthday and three days of mourning in case of death in the immediate family at full pay . . . And the New York Electrical Contractors Assn. and Local 3 have lined up a two-year contract providing for a $20-a-week payment ($15 by employers, $5 by the men) to an annuity fund for each electrical worker for additional unemployment pay.

Loss

James L. Matley, Kern County, Calif., electrical inspector, died recently. He was chairman of the Central California Chapter of IAEI. He was founder of radio station KMAR.

Golden anniversary

Garnett Young & Co. with offices in Los Angeles, San Francisco, Portland and Seattle and representation in Hawaii celebrated its 50th anniversary Dec. 10. It represents Chase-Shawmut, Connecticut Valley Enterprises, S. H. Couch Co., Simplex Wire & Cable, Walker Brothers and Vulcan Electric Co. and has Hawaiian representation for Arrow-Hart & Hegeman Electric, Steel City Electric and Wagner Malleable Products.

Named

Coil Winding Equipment Co. of Oyster Bay, N. Y., has appointed Tri-State Supply Corp. of Los Angeles, San Francisco and Seattle to represent it in the Western states.

New facilities

Appleton Electric Co. opened a new office and warehouse at 1216 Sixth Ave. South in Seattle. R. J. Lidgat is Seattle manager and Al Rockwell, Pacific Coast manager, attended the opening ceremonies.

New rep.

Hugh L. Bargion is now manufacturers' representative in Honolulu for A. B. Chance Co., Marvin Mfg. Co., Revere Electric, Sunbeam Lighting, Touch-Plate, Daniel Woodhead, Knox Porcelain and Progress Mfg. Co.

Lead the wires in

Wire guides are an ingenious gadget for electricians, manufactured by George G. Zachary of El Monte, Calif. They are flexible pieces of tubing to guide wire into conduit on all types and sizes of boxes or conduit fittings. These especially speed wire pulling in hot weather and remove kinks and snarls in the wire. A set of four, ½ in., ¾, 1 and 1¼ in., costs a contractor $8.10.

New job

Herbert G. Ufer, who retired Jan. 1 as Western superintendent of Underwriters' Laboratories Inc., has been retained as a consultant by Rome Cable Corp. to cover the Western territory he formerly traveled for the Laboratories.

Double duty

Gerald Petersen and his wife, Anita, of Petersen Engineering Co., Santa Clara, sent out a unique color transparency Christmas card picturing themselves near the pyramids in Egypt and writing a poem plugging their Pengo augers.

Back teaching

Walter Alerich has returned to Los Angeles Trade-Technical Junior College, known as Frank Wiggins Trade School, as instructor in the electrical department after a year and a half service aboard the U. S. Boxer. He had taught there prior to 1951.

Nema names

Two Westerners were elected to serve on the board of governors of the National Electrical Manufacturers Assn. at the annual election in November. Charles F. Mullenbach, president, Mullenbach Electrical Mfg. Co., Los Angeles, and Joseph S. Thompson, president, Pacific Electric Mfg. Corp., San Francisco, were named. Another ex-Westerner, John L. Busey, vice-president, General Electric Co., was named vice-president and J. H. Jewell, vice-president, Westinghouse Electric Corp., a frequent visitor to the West, was elected president.

Industrial watts

The first National Industrial Electric Heating Conference, sponsored by the newly formed Industrial Electrification Council, meets Jan. 18-22 at Cincinnati, Ohio. Enrollment is limited to 150 power sales engineers, industrial heating engineers and others concerned with the promotion and sale of industrial electric heating equipment. An electric heating course is to be made available for sale at the conference.

Awake now?

The 10th annual National Adequate Wiring Conference is to be at the La Salle Hotel, Chicago, Feb. 25-26. The aroused interest in doing something about wiring promises to make this a significant meeting.

New distributor

Osborne & Dermody has been named Westinghouse electrical apparatus distributor in Reno and Las Vegas, Nev. Headquarters are at 253 Chestnut St., Reno, with a branch operation at 1305 South A St., Las Vegas.

Sudden

Consulting Engineer Charles Von Bergen of San Francisco died of a heart attack the morning of Dec. 18, the date of the Northern California IES Section Christmas party at Hunters Point Officers' Club.

Quick data

Hatfield Wire & Cable Division has a pocket-size wiring data and weight computer that is being distributed to its customers in the electrical trade. Made of plastic, like a small slide rule, it gives instant readings of current-carrying capacities, cir-mil areas, voltage-drop data, conduit sizes required, motor wiring sizes, type-letter designations, temperature ratings, as well as weight data. It should be handy for estimators and foremen. Copies can be had by writing on company letterhead to J. Q. Bourne, Department 9, Hatfield Wire & Cable, Hillside, N. J.

Information

Among booklets and pamphlets recently announced are these: National Safety Council has its 1953 series of "Accident Rates" booklet available . . . Fluorescent Lighting Assn. has a new cold cathode handbook, 52 pages, selling at $1 per copy, from the association, Department E, 100 W. 42nd St., New York City . . . Illuminating Engineering Society announces a new edition of "Recommended Practice for Residence Lighting" at $1 and "American Standard Practice for Industrial Lighting" at 50c.

Your dates

Spring will be crawling with important meetings. Here are a few for your calendar: California Industrial Safety Conference, San Francisco, Feb. 11-12; Intermountain Electrical Assn., Salt Lake City, March 9; Refrigeration & Air Conditioning Contractors Assn., West Coast regional convention, Long Beach, March 11-13; PCEA Business Development Section series of meetings starts at Sonona, Feb. 24, ends at Phoenix, April 8; Electrical Maintenance Engineers of Southern California's Electrical Industry Show, Shrine hall, Los Angeles, April 1-3; Illuminating Engineering Society regional conferences—Intermountain, Denver, April 11-13; South Pacific, San Francisco, April 19-20; Pacific Northwest, Seattle, April 23-24; series of annual chapter meeting of International Association of Electrical Inspectors, dates not yet set, usually in late March and April; Rocky Mountain Electric League, Denver, spring conference, May 2-4; PCEA convention, Coronado, May 19-21; NWEL&PA, Business Development, Boise, May 10-12; National Industrial Service Assn. (Bill Hogue of Los Angeles, president), Detroit, June 13-17; AIEE, Los Angeles, June 21-25.

Hot lamp

A 1,550-w infrared heat lamp, developed by Sylvania for use as an electric range element, is now offered the trade for industrial heating applications. With gold-plated reflector in a Vycor glass bulb, it has two filaments, one 650 w, the other 900 w, gives a range from 587 Btu/hr to 5,290 in various series and parallel combinations on 118 and 236 v.

Water pressure

May is National Water Systems Month and the Plumbing & Heating Industries Bureau has advertising materials and plans available to farm equipment dealers and contractors to promote electric pumping plant sales both for domestic and for farm production use.

Quickie

Lightolier makes available to fixture dealers a 10-lesson newsletter course in nontechnical language for salesmen and saleswomen on architectural lighting.

Scale raised

Motor shops in Fresno signed a new contract with Local 100, IBEW, which increases the scale 15c an hour to $2.35 and with double time for work after 11 p.m. Negotiations were also under way with the NECA chapter for inside wiremen whose contract expired Jan. 1.

New code

A new revision of the electrical bylaw for the city of Vancouver, B. C., was presented to the city council by Lorne Ryan, who worked on the Canadian National Code. It is modeled on the national code.

Path of light

That low-voltage remote switching can be made a selling feature for new homes is proved by two recent incidents. Henry C. Cox, builder in southern California, advertises "Electric Award Homes," with 15 electrical features, including master lighting control, A-W certification and built-in equipment. And in North Sacramento a new tract of 6,000 homes will all be Touchplate equipped. As far back as 1942 Electrical West advocated tying in the push-button relay control of lighting with A-W standards as an appealing selling feature. Now it comes true.

On its own

Leadlight Fixture Co., now a division of Oakland Engineering Co. since separation from the former Leader Co. in the East, has issued a new catalog of its Leadlight fixtures. There are 18 different series of fluorescent commercial and industrial types.

Nobody to cuss

Operatorless elevators are a reality and the robot mechanism that runs them does a job of dispatching and adjusting to the traffic flow that not even the best starter could match, it was demonstrated by the Westinghouse elevator division as it toured the West with an elaborate working model of a building with four miniature elevators. Gano Baker, Pacific Coast district manager, now in a new elevator headquarters building at 715 Harrison St., San Francisco, brought it there after it had been shown to architects and engineers, building owners, etc., in Denver, Seattle and Los Angeles.

Who sells who

An inspector made this sage remark—"If contractors would do as good a selling job on their customers as they do on us inspectors to get by with something inferior they'd do better for themselves too. Often we inspectors do more of a selling job on their customers than they do."

Los Angeles delegation to NECA's convention signified endorsement of the theme by gathering under its banners. Left to right —Jack Rollins, assistant chapter manager, Al Short, Emmet Swearinger, Harry Vancott, Herb Evans, president, Sid Hill, governor, Charles Wikle, president elect, Al Berg, Ran Doll and Julien Davis. With this business promotion program NECA . . .

Turns from Public Works to Public's Work

Connected load of program was high, voltage arose to a few peaks over dues amendments, means to reduce (sales) resistance were urged and current flow of delegates to Miami Beach was exceptional for the National Electrical Contractors Assn. annual convention, Nov. 12-20. Of the 1,700 attending about 75 contractors plus their wives were from Western Region's Districts 6 and 8, representing 16 of the 19 chapters. This does not include Arizona and New Mexico Chapters in District 5.

Appropriately emphasis was switched from government work back to the general public in the theme, "Serve the Public and Prosper." This brought forth a new plan to finance the business development program from profit on its magazine (which endangers the association's nonprofit income tax status), by a resolution warning chapters against labor contracts with unions loaded with excessive rates, travel, vacation and welfare costs, or discriminatory clauses against nonresident contractors.

On the panel on business promotion Harry Vancott, Los Angeles contractor, asked the realistic question, "What about the differential?" He said that where the contractor's customer is sold materials even at prices lower that his, incentive to do selling is killed, hence that a differential was needed. The resolution from Northern California Chapter, calling upon distributors for firm prices and another warning contractors to question fine-print joker clauses in supply contracts were both passed.

Nine proposed amendments were the main object of debate both by the board of governors and in the closed session for members. Two were approved; the first to eliminate the two special sections for IBEW employers and for line construction and make them committees instead with representation at administrative committee meetings; the second from the Alaska Chapter that NECA members must belong to the chaper in which their office is located. The amendments pertaining to dues were all rejected, even one to cut dues percentage of labor pay roll. Changes in qualifications for nominations of president and district vice-presidents were voted down but a resolution passed for a review of the organizational structure and recommendations for a more businesslike method of electing officers to be made next convention. Don B. Clayton, Birmingham, was re-elected president by large majority over O. F. Burnett of Chicago. There were no elections for officers in Districts 6 and 8 this year, but H. J. Hill was elected District 5 vice-president.

Harry Vancott, "Where's the differential?"

Honor was paid deservedly to A. L. Stone, Los Angeles, retired, in electing him to honorary membership. He was vice-president and executive committeeman for District 6, president, then treasurer of Los Angeles Chapter. The McGraw Award for electrical contractors was presented to Erne C. Carlson of Youngstown, long-time chairman of the labor relations committee.

The governors recommended changes in selecting panel members on the Council of Industrial Relations which would permit staff and chapter manager to serve. Another action was to protect the association from chapters engaging in any illegal activities.

Contractors

Electrical contractors and the county electrical inspector of Hilo, Hawaii, met with Associate Editor W. A. Cyr of ELECTRICAL WEST Nov. 13 for an informal discussion session, sponsored by William MacKenzie, manager, Hilo Electric Co. Topics covered in the general discussion period were the problems of selling more circuits and greater adequacy, experience with radiant heating installations and the utility's problems in changing over the old plantation electric systems and extending new lines to the Kau district.

The utility no longer does contracting and only a little merchandising, offering wiring allowances for ranges and water heaters. An interesting situation arises from those who have a range installed and then become aware that the other circuits in the house are not adequate. That more circuits should be sold at the time wiring is being done for the range was the consensus.

Radiant heating is something new to the area and there were many questions regarding its safety, current consumption, time lag, etc., from mainland experience. The Island of Hawaii has county electrical inspection, and Edward Isomura, who was present, is county inspector. Wes Wallace, former Californian, operates the only union shop on the Island, doing maintenance and alteration work chiefly, and sugar mill work. Wallace has recently built a house with a complete electric kitchen.

Maintaining voltage has been a major utility difficulty over old lines but gradually the system is being rebuilt and improved.

Both contractors and inspectors met in joint meeting in Honolulu Nov. 18 to hear W. A. Cyr, associate editor, ELECTRICAL WEST, present "What an Association Can't Do and What It Can" and the humorous "Little Daisy No-Wiring System." Harry Peters, chairman of the Hawaiian Chapter, International Association of Electrical Inspectors, presided. John Thomas Carey, Honolulu electrical inspector, who had just returned from the IAEI Silver Anniversary Convention at Chicago, gave a report on it.

A free home-wiring checkup and job estimate, promoted during the week of Oct. 5 with National Fire Prevention Week, was the first of many promotions planned by the recently formed Electrical Contractors Assn. of Hawaii. Assisted by Hawaiian Electric Co., the association uses Reddy Kilowatt on a yellow and blue emblem that members place on their trucks.

Hilo electrical contractors meeting was attended by Edward Isomura, county inspector (cut off from picture), Shigeru Tanoue, Toshiaki Ito, Jiro Tanaka, Tom Okano, Henry Nelii, Wes Wallace, all electrical contractors, and William MacKenzie, Hilo Electric

Results from the first promotion were quite satisfactory. A number of wiring checkups and job estimates resulted in work for the contractors. Further promotional campaigns, similar to the Detroit Electrical Assn. plan, were under contemplation, it was reported.

Officers of the new association are Eugene Akamine, president, George Itamura, vice-president, Mitaka Nakagawa, secretary-treasurer, Paul Sagi, corresponding secretary. Directors are Robert Mujamasu, Edward Nikaido, Charles Sakumoto, and David Morishita who is also publicity chairman.

Morishita **Akamine**

Miyamasu **Nakagawa**

Electrical Contractors Assn. of Santa Clara and San Benito Counties, Calif., elected Ray Rosendin as its president and Fred Heacox secretary-treasurer at the annual board meeting. The officers were introduced at the annual dinner-dance Dec. 4, which had the largest attendance of any ever held, 169. Ralph Millard, Joe Santora Jr. and Chet Hershey were the committee in charge of the entertainment. The association is participating with the Northern California Electrical Bureau in the 13-week Adequate Wiring TV campaign.

Interior Electrical Assn., contractors group in the Kamloops, B. C., area, elected Lloyd Guichon as president and George Stevens secretary-treasurer.

NECA

Western Region's annual meeting for both District 6 and 8 of the National Electrical Contractors Assn. is scheduled to be held at Las Vegas, Nev., the week end of June 24-26. Both vice-presidents, Ed Buttner of District 6, Oakland, and Charles Simpson of District 8, Cheyenne, are coordinating on the program through the staff of the Western Regional office. Arrangements will be in charge of Jim Jeffers Sr., manager of the Nevada Chapter, NECA. Jeffers' headquarters are in Reno.

Redwood Empire Chapter, NECA, is the newest to be formed. It covers the north coast counties from San Francisco Bay, including Marin, Sonoma, and later perhaps Eureka in Humboldt County with Mendocino

and Lake Counties included. Manager is John R. McManus with headquarters temporarily at 535 Francisco Blvd., San Rafael. At an organization meeting Dec. 16, Fred Woodhull, North Bay Electric Works, San Rafael, was elected president; Edwin S. Mann, Santa Rosa, vice-president; and Jack Storrs, San Anselmo, treasurer. Carl Stolting, a long-time member of NECA of Santa Rosa, is governor. Directors are Jack Cimino, San Rafael and San Francisco, L. H. Leonardi, San Rafael, Fred S. Esslink, Sebastapol, and Morton S. Smith, Santa Rosa.

Los Angeles Chapter, NECA, elected Charles A. Wikle, a line constructor contractor, as its president, Ran F. Doll, Mactolf-Doll Electric at Glendale, vice-president, and Herbert L. Evans, the retiring president, as treasurer. Members of the board include Cliff D. Allen, Pasadena Division, Richard T. Arbogast, Lewis V. Barth, Andrew L. Hannon, Sidney F. Hill, J. B. Shamel, E. L. Swearingen, Robert F. Tarlton, Harbor Division, Harry R. Vincent, announced Warren Penn, executive manager.

Northern California Chapter board of directors elected as its officers at a meeting Dec. 15 in Richmond Walter J. Vance, California Electric Co., Oakland, president, Victor Perero, former president, Richmond, governor, Don Pearce, Vallejo, vice-president, and W. A. Cyr, treasurer. The directors include members from the three branches in Alameda, Contra Costa and Napa-Solano Counties.

IAEI

Dates for the two section meetings of the International Association of Electrical Inspectors in the West have been announced by the IAEI in Chicago. The Southwestern Section annual meeting will be held at Elko, Nev., Sept. 13-15, 1954; the Northwestern Section at Portland, Ore., Sept. 23-25. In the week between, the National Fire Prevention Assn. will hold a regional conference in Seattle. Dates for the series of annual chapter meetings in the West have not yet been decided by the chapters.

Puget Sound Chapter elected J. H. Watt as its chairman for 1954 at its Dec. 5 meeting in Seattle. E. M. Tubbs was elected vice-chairman, H. L. Holcolmbe, treasurer, and C. S. Alger, re-elected secretary. A review board was appointed to consider changes in Seattle's electrical code. Chairman Girard called on Watt, associate engineer, Seattle Building Department, for a discussion of the 1953 code changes, which consumed the remainder of the meeting.

Hawaiian Chapter of IAEI is one of the largest in the SW Section and these men helped make it so. Seated: E. L. Ralston Jr., vice chairman; Henry Peters, chairman; K. H. Swanholm, assistant secretary-treasurer. Standing: Harry P. Field, Hawaiian Electric, and John Thomas Carey, Honolulu chief inspector, both advisory officers

Rocky Mountain Chapter heard R. M. Wilson, G-E, Denver, discuss the use of 480/277-v industrial and commercial lighting circuits in new construction at a meeting arranged by Howard Cummings, Bureau of Reclamation, chapter chairman, in November.

Southern California Chapter elected Willard Burk, Huntington Park inspector, as its chairman; Harry Dobson, Santa Barbara, vice-chairman, and Ed Muller, State Department of Industrial Safety, was re-elected secretary-treasurer. Meetings for 1954 are to be at Electric Products Corp. new plant at Torrance Jan. 27, in San Diego March 24 and in Long Beach May 26. Barney Alverson of San Bernardino County has been the chairman during the past year.

IES

Dramatic lighting effects applicable to school, church, lodge stages and halls, homes and gardens, or for merchandising displays will be shown to both Northern California Section and San Jose Chapter of Illuminating Engineering Society, Jan. 21, at the Marines Memorial Club theater in San Francisco. Arch Monson, who heads both Kliegle Lighting Co. of California and C. J. Holzmeller Co., theatrical lighting distributors, is putting on a spectacular showing of what can be done. Included will be a 30-ft semitransparent screen for synchronized projection of music, light and color in a system known as Musicolor. Special invitations are extended to IES, to architects, consulting engineers, public officials, school executives and the electrical industry generally.

Inland Empire Chapter of IES was pleased at the response to a lighting design problems course that it offered its members, architects, the NECA chapter and the electrical industry; 79 enrolled for the four-session course. Not a theoretical course but a practical application design guide, the experience of these men was called upon: Nov. 20, on light sources and fixture design evaluation, W. C. Hird, Westinghouse Lamp Department, and Blair Plowman, Washington Water Power Co., Spokane, instructing; Nov. 24, store, industrial and flood lighting, Harold A. Gardiner, Columbia Electric & Mfg. Co., Seattle, and Paul Davis, Holophane Co., Seattle; Dec. 1, office and school lighting, David C. Mozes, G-E Supply, Spokane (chapter chairman), and Joseph M. Doyle, consulting engineer, Spokane; Dec. 11, panel discussions of questions from the class, Richard C. Harbour, professor of electrical engineering, Washington State College, Pullman, as panel leader and the panel of the instructors. The classes were held in Gonzaga University's engineering building. A registration fee of $2 for the course was charged to cover expenses.

NISA

Art Howard, Tri-State Supply Corp. of Los Angeles, addressed the Puget Sound Chapter of National Industrial Service Assn. on Nov. 3. He also spoke briefly at the Washington Electric Club meeting of Nov. 2. He is former president of the Los Angeles Electric Club.

PANORAMA OF THE PCEA

Section Meeting Dates Are Announced

Chairman J. A. Longley, Allis-Chalmers, San Francisco, has announced that the **Engineering and Operating** Section's annual conference will be held in San Francisco at the Mark Hopkins Hotel on March 18 and 19. Committee members are working on conference details and programs will be mailed to all members approximately a month before the meeting.

The Administrative Services Section's second joint meeting with the PCGA this working year, which will be attended by the four groups that did not take part in the Nov. 12 meeting in Hollywood, will be held April 7 and 8 at the Hotel Claremont in Berkeley. Subjects and sponsors for the conference are: Contract procedure — formulation and administration, E. V. Noe, PG and E, San Francisco; purchases and stores, A. A. Charonnat, PG and E, San Francisco; internal auditing, I. L. Comstock, Coast Counties Gas & Electric Co., Santa Cruz; accounts payable, N. J. Blaney, Southern California Gas Co.

Section Chairman George Coughlan Jr. and PCGA Section Chairman John Brass Jr., both of PG and E, are in charge of the meeting.

The Business Development Section's 10 regional meetings — worked out under the direction of Chairman Walter F. Chapman, San Diego Gas & Electric Co., and Vice-chairman J. A. Corlett, General Electric Co., San Francisco—are ready to go. The entire program was previewed at a guidance committee meeting held in San Francisco on Dec. 17. Local chairmen for each of the meetings were present to select portions of the program that would be of greatest interest in their particular locations. Since each regional meeting is, therefore, tailored for local conditions, record turnouts are expected. The schedule for the regional meetings and the chairmen are as follows:

Feb. 24, Sonoma Mission Inn, W. F. Page, PG and E, chairman.

Feb. 26, San Jose, D. S. Aiken, PG and E, and Louis Wollenberger, Coast Counties Gas & Electric Co., joint chairmen.

March 2, Marysville, W. R. Bowler, PG and E, chairman.

March 4, Visalia, L. R. Quinby, Southern California Edison Co., and V. C. Redman, PG and E, joint chairmen.

March 9, Long Beach, C. M. Campbell, Southern California Edison Co., chairman.

March 11, San Bernardino, W. K. Dunkle, Southern California Edison Co., and Robert Neuman, California Electric Power Co., joint chairmen.

March 18, Santa Barbara, E. B. Cummings, Southern California Edison Co., chairman.

March 26, Reno, A. L. Pierce, Sierra Pacific Power Co., chairman.

April 6, San Diego, E. W. Meise, San Diego Gas & Electric Co., chairman.

April 8, Phoenix, Jack Kiedaisch, Arizona Public Service Co., chairman.

Nominating Committee

PCEA President J. H. Pengilly has announced the appointment of the nominating committee for this year. Members are: Chairman, W. C. Mullendore, Southern California Edison Co.; vice-chairman, E. D. Sherwin, San Diego Gas & Electric Co.; I. W. Borda, Okonite Co.; R. D. Moody, Allis-Chalmers Mfg. Co.; M. G. Sues, Sues, Young & Brown; N. R. Sutherland, PG and E; George C. Tenney, McGraw-Hill Publishing Co.

Southern California members of the code and ordinance committee met in Los Angeles under Vice-chairman Leonard P. Shelley, Federal Electric Products Co., for a profitable and informative meeting. The agenda of subjects important to the electric industry included:

1. Issuance of a 1953 edition of the Uniform Electrical Code by the PCEA to conform to the 1953 edition of the National Electrical Code.

2. California's new state law permitting the adoption of codes by reference, and the status of the Uniform Electrical Code under this law.

3. The effects of the Los Angeles sales ordinance, and how it is affecting members under its present interpretation.

4. A report of the present status of the proposed new Los Angeles City Wiring Code.

5. A report on the progress made by the Electrical Safety Orders Wire Tables Committee.

6. The International Association of Electrical Inspectors' Silver Anniversary Convention in Chicago.

A letter has just been received by PCEA from the state attorney's office saying that the Uniform Electrical Code (1951 edition) has been approved for adoption by reference by California cities and counties. This was necessary under the new law enacted by the last State Legislature, and will enable the code and ordinance committee to continue its work in this field.

Safety Angle Stressed

Each committee of the Engineering Economics Section of the Pacific Coast Electrical Assn. will be asked to incorporate the safety angle in discussions at the spring annual conference to be held in San Francisco. That request was decided upon at a recent meeting of the association's accident prevention committee held at plant 4 clubhouse, Bishop Creek, Calif., Chairman C. W. Eddy, California Electric Power Co., presided.

The practice of taking clearances behind a supervisory or microwave-controlled air break switch was considered. Members will discuss the matter with their operating departments before the committee makes recommendation. Fifteen of the rules in the new uniform safety rule book recently adopted by all member utilities were discussed for possible revision. Suggested changes will be reviewed at the next meeting of the committee.

EMEA

With an old-timers' meeting Nov. 18 and a meeting featuring the subject "Bearings" the Electrical Maintenance Engineers Assn. of southern California wound up a highly successful year Dec 16. Speakers were Mark Anderson of Fafnir Bearing Co. and Don Huseman of St. Louis Bearing Co. with a panel of industry users consisting of R. J. Kernaghan, Goodyear Tire & Rubber Co., Henry Schumacher, Richfield Oil Refinery, Walter Wood of Lockheed Aircraft Corp. The old-timers' meeting was featured by pictures and exhibits of pioneer electrical equipment. Henry Bush, Jerry Ellis and Henri Ledeboer were elected to honorary membership at that meeting. The electrical industry show, sponsored by EMEA, is dated for April 1-3 at Shrine Exposition Hall.

ELECTRICAL WEST Sales Guide

News Letter

January 1954

FOR THE ELECTRICAL MERCHANT OF THE WEST

The cuckoo is the bird that fouls its own nest. Many dealers seem to have gone cuckoo lately and are teaching the public to distrust all merchants, to think there are exorbitant profits in appliances and TV, to shop, seek discounts, to encourage co-ops--in short, to discredit business and businessmen. A price war in Fresno hits a new low in price cuts and ethics, even drawing ads from Better Business Bureau to warn the public to beware. Fine public relations!

Blind?

Last year may have been the year of chaos in the appliance business--with a complete scrambling of lines, distribution, franchises into an indigestible stew. But 1954 had better be a year of cooperation or it can be one of disaster. The cooperation will have to include the manufacturer, utility, distributors, contractors and dealers and the program will have to resell the entire electrical living ideal and re-establish some integrity among the industry to restore public faith.

. . or else

While electric leagues, associations and Better Business Bureau have been trying to soothe the public and tell them color TV is still for the wealthy and far away, the manufacturers and broadcasters have made them seem foolish by broadcasting the Pasadena Rose Bowl parade in color, by big full-page ads and statements to the press, and by a race to build sets and get them on the market. RCA's ad drew others from Zenith and Philco, protesting that RCA didn't do it all by itself but that FCC approved the NTSC standards of all makers. . . A survey of 2,500 TV set owners in Los Angeles found few willing to pay $500 for a color set and all would wait for a 20 or 21 in. at least. . . The color publicity may be partly what caused wide b&w set dumping.

Color crazy

That electric ranges are twice as efficient as bottled gas, electric refrigerators 11.6 times as efficient as gas and even electric water heaters have an edge of from 1.6-to-1 to 2-to-1 over bottled gas water heating has been proved in a year-long test by the U. S. Bureau of Human Nutrition and Home Economics, USDA. NEMA will have a booklet soon to give all the facts. Perhaps the gas industry's new slogan about heating water three times faster should also say "with six times more Btu." The gas industry is using a $1,250,000 campaign to blast a bigger share of the 1954 appliance market in ranges, water heaters, etc.

From real authority

Dynamic Bob Bale will be the headliner and there will be the most surprising change in program and action at the Western Radio-Television and Appliance Trade dinner during winter market at Western Merchandise Mart, San Francisco, Feb. 10. Even a cocktail hour before dinner!

Don't miss it

Trade shows everywhere in January and February. As this goes to press the Chicago markets are showing. NARDA is holding its spring convention the week of Jan. 10, with an accent on color TV. . . Los Angeles Winter Market runs Feb. 1-5 at both Los Angeles Furniture Mart and Shrine Exhibition Hall. . . Western Winter Market in San Francisco's Merchandise Mart runs Feb. 8 through 12. However, housewares, lamps and giftware exhibitors will begin showing Jan. 31 through Feb. 3 with Western Merchandise Exhibitors Assn. showings in the civic auditorium and three hotels. . . In Los Angeles the ninth California Lamp & Picture Show at the Biltmore, managed by Los Angeles Trade Fair Inc., runs Jan. 31 to Feb. 4. The California Gift Show runs Jan. 24-29 at several Los Angeles hotels. . . Kay Leber also announced a Pacific Northwest Gift Show Feb. 14-17 at Seattle civic auditorium and a Portland show Feb. 21-24; a Spokane gift show at the Davenport Feb. 28 to March 2. . And Cap Kierulff announces the 1954 Audio Fair at Los Angeles Alexandria Hotel Feb. 4-6.

Show time

League events scheduled are: Installation banquet, Westward Ho Hotel, Phoenix, for Appliance Merchandisers Assn. Jan 13. . . San Diego Bureau of Home Appliances annual winter conference Feb. 24 in Balboa Park; tenth annual Spring Fair of Modern Home Ideas, April 23-28, same place. . . Intermountain Electrical Assn. moved its annual conference from Provo in February to Newhouse Hotel, Salt Lake City, March 9.

Selling sessions

Remarkable record of cooperative appliance exhibits at fairs and appliance shows and of cooking schools by Northern California Electrical Bureau was reported by LeRoy Bennett, manager, in November. Twenty-two cooperative appliance exhibits had been seen by 601,566 prospects and 32 cooking schools in northern California had totaled to 14,510 attendance. Five more were scheduled before year's end.

Meet the people

National promotions sponsored by Edison Electric Institute and National Electrical Manufacturers Assn., leagues and national associations include range and water heater programs for spring showings in March, April and May under an over-all slogan "Be Modern - Live Electrically." The electric housewares industry will carry on year-round promotions under "First Gift Choice - Electric Housewares." The farm and home freezer section is aiming at home economics classes with a freezer teaching hit. Freezer promotion months are May, June, July and August. A dryer promotion under "Why Do It the Hard Way?" is scheduled for September, October and November. . . And 1954 is Light's Diamond Jubilee year with big plans for activities everywhere.

Schedule for year

Few price reductions have been announced. National Presto Industries cut its coffee maker from $34.95 to $29.95; fryer from $39.95 to $29.95 . . . Broil-Quik cut its rotisserie from $69.95 to $49.95 for a six-week period. . . ABC reduced its electric clothes dryer to $199.95, a drop of about $50. . . Several makes of TV announced table-model TV sets at $179.95 for 21-in. screens.

Slight drops

To aid dealers get important new lamp and lighting business, Lightolier has a wall lamp display of 20 to 25 wall lamps of all styles and kinds in a single vertical panel. While portable and plug-in type, they are not so-called pin-ups but carefully engineered lighting devices for traditional and modern homes. . . G-E Lamp Division has launched a package or "roomful" lighting selling idea in a series of dealers' meetings.

Light business

Northwest Appliance & TV Assn. elected Lib Tufarolo, Lib's Bellevue Electric, Kirkland, president; Jim Marks, Zerega Distributing Co., Seattle, 1st v-p; Frank Countner, Countner's Inc., 2nd v-p.

New crew

Among distributors the musical chairs go on. In Denver, the big change was when Boyd Distributing Co. gave up the Norge line it has long handled to Allied Appliances Inc.; Motorola also, and became the Philco distributor for Colorado, southern Wyoming and western Nebraska. Allied, which handled Admiral before, was cut off by Admiral which may set up another of its factory branches. . . In San Francisco, McCormack & Co. gave up its Hoffman line and its 459 Ninth St. to the Hoffman Sales Corp. for a new factory branch and moved into the Western Merchandise Mart as distributor for A. O. Smith water heaters, Mitchell air conditioners, ABC laundry equipment and Regina home polishers. John N. Barker, formerly of Admiral, becomes manager of the Hoffman branch. In San Diego Hoffman did the same with Appliance Distributors Inc., continuing at the same location. Walter Harvey retired and Burt Dorris, well known in the area, was made manager of the Hoffman San Diego branch.

Who has which now

Harper-Meggee Inc. vacated the RCA-Victor account for Seattle and Spokane. . . Emerson Radio took over the Century Distributing Co. radio-TV sales division as Emerson Southern California Inc. Century continues in San Diego. Conrad Platt is president and Joseph Weissman treasurer of Emerson Southern California at 1335 S. Grand Ave., Los Angeles. . . California Distributing Co. of Oakland, Revco home freezer distributor, opened a branch office at 2515 W. Slauson Ave., Los Angeles, taking over the line from U. S. Grant Supply Co., which is undergoing reorganization. Don Huntoon is in charge. Revco also announced Honolulu Seed Co. Ltd. as Hawaiian distributor. . . Great Western Fuel Co., E. 210 Boone St., Spokane, is now CBS-Columbia TV distributor. . . Raytheon in Spokane has Valco Distributors at S. 125 Stevens. . . Lenihan Distributing Co. of Seattle replaces Seattle Hardware Co. as Thor distributor. . Fred Fenton of Apex announces Radio & Television Corp. a new distributor in Honolulu with Roy Bright v-p and gsm, and Thomas Dahl president. It also carries RCA and International Harvester. In Los Angeles Zastro-Goetten Co. was named Apex exclusive distributor. . . O. B. Wilt Co., representing the Deering Air Conditioning Co. for the Pacific Coast and Hawaii, has appointed Peerless Pacific Co. of Portland as distributor. . . Amana has selected Holliday Distributing Co. in Albuquerque. . . D. N. Latus & Co., Helena, is distributor of Perfection Stove Co. products in Montana and northern Wyoming. . . Pacific Mercury TV has put in a factory branch for Spokane, Seattle and Portland.

More moves

Philco-Los Angeles has opened another factory branch at Long Beach taking over H. D. Waller Inc. plant with Arthur Pressler in charge. . . Horn & Cox Inc. is southern California distributor for the Simplex ironer line, formerly handled by Leo J. Meyberg Co. The latter has announced closing of its Los Angeles branch. . . Servel is now distributed by Kimball Distributing Co. in Salt Lake City. . . Packard-Bell has appointed Edward G. Litfin Seattle distributor and Bert L. McReynolds at Stockton. . . Admiral opened factory branch distribution in Anchorage, Alaska, with William W. Winkles as manager.

Still more

Simplified directory sections of the telephone books will result from the Electric League of Los Angeles' work with the Pacific Telephone & Telegraph Co. The Los Angeles directory will reduce number of headings for the appliance business from 44 to 19, or 57%, beginning in the August 1954 directory. . . The league also issued figures on room air conditioners, not including evaporative coolers, in the southern California counties excepting San Diego and Imperial. There were 10,744 sold in the nine months from Jan. 1 to Sept. 30. . . Color TV window "telegrams," meetings on the color situation, an organized drive against abandoned ice boxes were other league activities recently.

Number please

Several top manufacturers have been seriously concerned over the discounting situation and studies have been conducted in Los Angeles and San Francisco. A few lines have taken steps to clean up the situation and have refranchised fewer dealers, notably Ironrite. — Inside job

Eureka, which merged in 1945 with Williams Oil-O-Matic and made cleaners, disposers, heaters and air conditioning equipment, has now been sold to Henney Motor Co., an automotive body maker. . . Noma Lites Inc. has bought the Leo Pollock Co., another manufacturer of Christmas lighting equipment. . . Philco Corp.'s purchase of the Dexter Co., to round out its major appliance line, was announced last month. . . Royal Vacuum Cleaner Co., owned by P. A. Geier Co. originally, has been resold to former officials of Geier Co. It will now be known as Royal Appliance Mfg. Co. with a plant in Cleveland. . . Nesco Inc. purchase of Dulane Inc. has also been completed. . . Herman Kaye, recently resigned as secretary of Kaye-Halbert Television, formed Caltech Electronics Corp. of Culver City to make high-fidelity equipment. . . Verplex Co., maker of lamp shades, has bought Modspe Inc. of Pasadena to make it a West Coast factory. — More merging

Don W. Rennewanz moves to Los Angeles under a realignment of Hotpoint distribution. He was North Pacific district manager in Seattle. He will now service the General Electric Supply Hotpoint distributors in the West, and "Buzz" Koch the Graybar accounts out of San Francisco. . Hotpoint's new line, completely divorced of G-E manufacture, has its own new look, includes three 30-in. ranges with an ingenious oven arrangement. Has announced built-in ovens and range tops. — Hotpoint change

General Electric introduced its new automatic coffeemaker, capable of making from two to nine cups extra fast and with a reheat feature, to the Western market first. Initial six months production will be distributed here. Wide mouth and well make cleaning easier too. — First in the West

Sunbeam's newest appliance is an automatic frypan with controlled heat. With a square design, it holds extra quantities of food, has a heat control dial on the handle and a water-sealed element permitting immersing the pan in water to clean. Sells at $24.95, fair traded. — Automatic skillet

Norge has shortened its refrigerator line to four models, headed by two refrigerator-freezer combinations. The two single-door combinations feature a system eliminating all manual controls, and making defrosting unnecessary by defrosting after each cycle. — Simplify selling

Westinghouse also has a new percolator-type automatic coffeemaker to brew from two to nine cups fast and maintain coffee at serving temperature. Fair traded at $29.95. — Fast on the brew

Frigidaire's newest ranges feature one model that, without any extraneous equipment, will deep-fat fry, simmer, griddle fry, broil, roast, bake and even pop corn. The new line introduced in late December is so versatile that practically any feature desired can be furnished to the customer from one of the 12 porcelain-finished models in 21-, 30- and 40-in. sizes. Wattage of all six-inch surface units has been increased for faster cooking. Higher backs give better lighting on the range. Prices seem to be tailored to the new outlook for 1954 too. — Anything you want

Monday is preferred over Friday by 799 to 265 retailers; 83 to 80 exhibitors for Market Day at Western Merchandise Mart. Recent ballot shows retailers favor markets changed to April or May, October or November 624 to 373; exhibitors, 91 to 75, favor January and July dates. — Better times

Christmas Tree Lane in Balboa Park led them to three buildings and inside such new things as a radar range interested throngs as

San Diego's Appliance Show Tops All

A big lift to the appliance volume in San Diego has been reported as a result of the highly successful 20th anniversary Electrical and Home Appliance Show of the Bureau of Home Appliances of San Diego County. Every year this show breaks previous records and this year some 187,000 were estimated to have visited the six-day showing in three Balboa Park exposition buildings, ending Dec. 2.

Immediately following the close of the show the 80 six-sheet outdoor posters used for that event were shifted to the Christmas appliance theme and car cards, newspaper ads and radio announcements stressed electric bed covering. Last reports indicate a tremendous volume of appliance business for the area for Christmas.

Although the show followed the familiar pattern of past shows many new attractions and tie-ins gave it a freshness that drew huge crowds. The show is always free to the public. An opening night ceremony on the steps of the Natural History Museum featured the mayor and public officials who switched on the lights along "Christmas Tree Lane." This year the lighted trees stretched across Balboa Park and even Cabrillo Bridge. And for the first time since the wars California Tower was floodlighted. This ceremony, including an a cappella choir, was telecast over both channels 6 and 8. Christmas Tree Lane remained lighted throughout the entire month of December.

One of the biggest attractions was Raytheon's radar range that cooked meats in seconds and minutes instead of hours. Crowds surrounded it constantly to sample foods that it cooked in an open oven before their eyes. As during last year, Santa Claus was a major attraction for the children and the bureau was fortunate to have an exceptionally gracious and lovable Santa. Model train exhibits drew throngs. The "see yourself on television" demonstrations of channel 8 and Kalbfell Electronic Laboratories had everyone "mugging."

Although there were few new appliances the new features were played up. Easy's new automatic got a lot of attention. Demonstrations drew the most crowds, even the stand-bys like Ironrite, the Dulane doughnut, and hot coffee from many automatics. Plastic model dishwashers and washers from which the public could see the action were effective selling tools.

There was a lot of "hi fi" on display, the table and console models as well as equipment for built-in sets. On the whole, white goods seemed to draw more interest than TV. And a locker plant with a food freezing exhibit showed that there is still desire for reliable food plans.

The electronics division of the bureau sponsored an educational booth from which several thousand copies of the Better Business Bureau's TV service booklet were given out. This tied in with the bureau's effort to clear the air of the fraudulent lone-wolf service men who have been preying on the public and to direct the public to the trained, identified and certified repair and service men of legitimate shops.

By common consent no color TV sets were shown nor advertising done and the public did not ask about color. In fact, large sets and combinations, which had been moving slowly, began to sell again.

"From beginning to end," says J. Clark Chamberlain, bureau manager, "this 20th anniversary show was the smoothest and perhaps the most pleasing of any we have ever sponsored. The show committee, under chairmanship of R. T. Redfield, with members Lee Bornstein, Boo Hoff, E. W. Meise, El Nystrom and George Porter, did an outstanding job."

Dates for the first two big events in 1954 were also announced. The annual winter conference is set for Feb. 24 at the House of Hospitality in Balboa Park. The 10th annual spring fair of modern home ideas is to open April 23 and run through the 28th. It will be in the same buildings in which the Christmas show was held.

Mac Really Retires

Andrew Craig McMicken, a pioneer in electrical merchandising if ever there was one, for 39 years general sales manager for Portland General Electric Co., retired for good. Since 1950 when he "retired" he has been a sales consultant. Mac started as a delivery boy in the supply department in 1902, rose to be sales manager in 1911.

Board of directors, San Francisco Bay District Chapter, NARDA, at the Western Merchandise Mart. From left: Jack Hickey, Hickey's, South San Francisco; H. D. Pischel, Dohrmann's, San Francisco; Frank C. Brodie, Brodie's, San Francisco; J. C. Gillivan, Breuner's, Oakland; Stanley Michelsen, San Francisco; W. J. Lee, Sherman Clay, San Francisco; Clarence Dulfer, Dulfer's, San Francisco, president; Carl Hagstrom, General Appliance, San Francisco; Walter Hoffman, attorney; W. O. Saxe, Sterling Furniture, San Francisco, vice-president; Jack Dreyfuss, Wisnom's, San Mateo, treasurer and secretary; Raymond Roelse, Jackson's, Oakland; W. R. Lachman, Lachman Bros., San Francisco. Headquarters of the new chapter are at the Mart

S. F. Bay Dealers Form NARDA Chapter

Top names and firms in the electrical appliance merchandising field in the San Francisco Bay area are to be noted in the officers and board of directors of the newly formed San Francisco Bay District Chapter of National Appliance and Radio-TV Dealers Assn., started last month. That these firms are organized to tackle some of the major difficulties of the appliance business from the dealer level is looked upon as significant in a time of distribution chaos.

Although the Bay area is said to be cleaner than most places the group aims to keep it that way and improve it wherever possible. Its officers see no conflict with the over-all promotional Northern California Electrical Bureau and they plan to work closely with it on all promotional campaigns. Need is felt, however, for more emphasis on trade relations, trade practices and legislative watchdogging.

Clarence E. Dulfer of Dulfer's, San Francisco, is the president. W. O. Saxe, Sterling Furniture Co., is vice-president. Treasurer and acting secretary is Jack Dreyfuss of Wisnom Appliance, San Mateo. The board of directors includes: Wesley R. Lachman, Lachman Bros., San Francisco; Roy O. Hurd, Hale's Appliance Stores, San Francisco, Oakland and San Jose; W. J. Lee, Sherman Clay & Co., San Francisco, Oakland and San Jose; Carl O. Hagstrom, General Appliance Co., San Francisco; Jack Hickey, Hickey's, South San Francisco, Lomita Park; John C. Gillivan, Breuner's, Oakland and Berkeley; Frank C. Brodie, Brodie's Inc., San Francisco; Stanley Michelsen, Stanley's Radio-TV Service, San Francisco; Charles E. Snell, W. & J. Sloane, San Francisco; H. D. Pischel, Dohrmann Commercial Co., San Francisco; Raymond Roelse, Jackson's, Oakland; Richard B. Silva, Gordon & Silva, San Jose.

At present the mailing address of the chapter is Box 21, Merchandise Mart, San Francisco. Monthly meetings are planned both of the board and the general membership. Another NARDA group had already been started in the Oakland or East Bay area some months ago.

Sell Lamps by the Houseful Urged

Designed to help the retailer sell lamps as he does furniture by the roomful and by the houseful, Lamp Fashion Festivals, $1,000,000 national consumer program, are being promoted by General Electric Lamp Division, the Lamp and Shade Institute of America, electric service companies and leagues.

The program was introduced to northern California dealers at a luncheon Dec. 15 in San Francisco, where F. M. Falge, manager of G-E Lamp Division's Pacific sales district, was host and Walter Carlson, merchandising and promotional specialist, outlined the plan.

Scheduled to continue through Light's Diamond Jubilee in 1954, the festivals are consumer shows to be staged by electric utilities in cooperation with lamp retailers as a means of stimulating public interest in portable lamps coordinated to the decorative scheme of the home and seeing needs of the family.

Emphasizing that merchandise needs to be properly displayed if it is to be sold, Carlson showed slides of the July Cleveland festival, a trade preview. About 80 portable lamps were displayed, all in room setting and carrying out the theme, "Ensemble your lighting as you do your furniture." Three styles, traditional, contemporary and modern, and three price ranges were included, as were lamps for specific tasks and for decoration only.

Stating that an average of five portable lamps per home is now in use, Carlson said that 15 per home are needed. He estimated that American homes today have 150,000,000 portable lamps; need at least 750,000,000.

Aiming at this market, G-E will back up its festivals with magazine advertising; TV commercials; merchandising packages containing suggestions for tie-in ads, lamp display ideas, special promotion suggestions and sales training information.

Live Shows Now Reach Spokane

Celebration of the connection of Spokane to the live television network through microwave and coaxial cable was combined with the annual meeting of the Inland Empire Electrical League, Spokane, Nov. 30, with President Maage LaCounte presiding. Pierre McKellar, division manager of Pacific Telephone and Telegraph Co., was the featured speaker and city and county commissioners were guests of honor.

Another microwave link between Portland and Spokane was predicted soon by McKellar as he described the nation-wide network erected by the Bell System in six years. Live shows from New York or Hollywood can now be brought to Spokane over this latest link from Seattle to Spokane.

Results of a mail election for the league's 1954 board of directors were announced as follows: Len Albert, Harper-Meggee Co.; Frank Anderson, Monroe TV; Marv Bennington, Cohn Bros. Furniture; Ed Bargquist, Washington Electric & Appliance; Herb Gullberg, Northwest Radio & TV; Carl Hicks, Wesix; Kimball Jack, Washington Water Power Co.; Ed Keegan, Northwest Hardware; Herb Korthals, Graybar; Bill Lowry, WWP Co.; George Mack, Hillyard Furniture; V. E. McCain, Graybar; Dave Mozes, General Electric Supply Co.; Matt Priest, Mast's Inc.; D. Quinton, Quinton Electric; Les Stewart, Maxwell's; Joe Thomas, Densow's; Frank Tool, WWP Co. The board was to meet later to elect officers for the new year.

Right from Wrong

A good clean start for the year is advocated by the Intermountain Electrical Assn. in Salt Lake City as one of its committees has finished the work of a year to develop a list of advertising and selling standards that are recommended to be followed voluntarily by all the industry in the region. The printed copies of the standards have just been sent to all members and the press. The use of these standards by all is urged because they will promote good business practices that will win public approval and result in successful business.

Covered in the standards are recommended practices in respect to these things: unfair competitive claims, bait advertising, sale of seconds, free offers, price reductions, use of illustrations, trade-in allowances, contest prizes, liquidation and going-out-of-business sales, wholesale selling, place of business, special group sales and sales by electrical contractors and dealers of approved appliances.

"These standards," says Manager James Schricker, "are for the guidance of manufacturers, distributors, dealers, contractors and servicemen. They have been developed with the active cooperation and support of the leaders of the industry and governing agencies and subscribed to by each chapter of our organization."

The date for the annual conference of the IEA, it was announced, had to be changed because the meeting place selected in Provo had burned down. Instead of Feb. 5 it now will be held at Newhouse Hotel in Salt Lake City on March 9, and George Earl of Utah Power & Light Co. has been named the chairman. A. M. Stephens had been chairman for the Provo arrangements that were canceled.

A new roster of membership has been printed also by IEA for the convenience of members and committeemen.

Real Test of Home Load

Probably nowhere else has a perfect setup existed to record the normal demands and load characteristics of modest homes all-electric equipped but such a tract of homes will soon be available in Honolulu. The Halumana Crater subdivision being built by Lykens & Foster, Texas builders, will have 750 residence units consisting of one-, two- and three-bedroom houses and will be all-electrical equipped. The equipment will include a 4-kw water heater, uncontrolled, of the type recommended in Honolulu by Hawaiian Electric Co. It will have two 2,000-w elements with separate thermostats but not interlocked. Hence both may come on at once if necessary. Other equipment will include an electric range and refrigerator.

Hawaiian Electric Co. will put on recording demand meters to check the load for a year. Each house, of course, will have individual meters as well. After a year's operation it is felt the company can then tell how the demand coincides with the peak on the system. The peak usually occurs in November.

This will be the first all-electric tract in which such a situation can be studied. Across the road is a similar tract but the homes are not metered and so the data are difficult to obtain. Neither is it a fair test of how people use electricity under metered conditions.

Load factor study is one of the important phases of this experiment. Estimates have been made that it will be 50% or better. Much speculation has existed regarding water heater load and its effect on the system. This study will provide some basic information.

An interesting angle is that the tract is being built by builders who own gas wells in Texas and who have had unfortunate experience with electric homes in a Texas community. In that case water heaters of too small capacity were installed and complaints were numerous. Hawaiian Electric feels that the recovery rate needed to supply good hot water service, where homes are using automatic washers and dishwashers, requires water heating of this type. David M. Moncrief Jr., assistant commercial manager, gave a paper on the subject at the PCEA fourth Hawaiian conference, Nov. 20. In it he said that heaters must have a recovery rate of at least 20 gal per hour, which means a 4-kw, 30- or 40-gal heater. NEMA standards are felt to be inadequate, requiring only 8 gal per hour recovery with 1,500 watts capacity. Distributors there have agreed to cooperate.

RMEL

Urging all of its members to give it suggestions for an all-inclusive dealers' program during 1954, the Rocky Mountain Electrical League will hold a sales and promotion conference in Denver in February. Other dates announced are the Electric Meter Institute, Denver University, March 22-26; the spring conference at the Shirley-Savoy Hotel, Denver, May 2-4; the annual picnic at Elitch's Gardens, July 30 or Aug. 6; and the fall convention at the Stanley Hotel, Estes Park, Sept. 12-15. The league plans celebration of its 1,000th adequately wired home early in 1954.

EERA

Earl S. Condon, president of the Electrical Equipment Representatives Assn., has announced the annual winter meeting will be held Feb. 8-11 at the Biltmore Hotel, Los Angeles. On the agenda is election of officers, forums and discussions on subjects of mutual interest to members, and trips to southern California scenic spots. Richard A. Kent is executive vice-president.

ELECTRICAL WEST

How to Break a PUC Log Jam

APPLY unprecedented growth together with inflation in materials and wages to 550 utilities subject to commission regulation and the result is bound to be a flood of petitions for rate relief. Heavily burdened commission staffs ultimately are inundated and rate applications may take two years for processing.

This actually was happening in California. Then the Public Utility Commission decided to do something about it. Result is a technique that has speeded proceedings to a point where the latest rate decision in the case of the Coast Counties Gas and Electric Company was issued within six months of filing. Complete cooperation between utility and commission staff, coupled with a series of informal hearings, accounts for the success of the plan. Utility and staff minimize their differences informally. This is followed by a prehearing conference, again informal, at which public bodies have an opportunity to present their viewpoint and to receive copies of all exhibits. Thus only broad fundamental issues are left for a formal hearing and decision. In the Coast Counties case this lasted but three hours.

Utilities and commissions everywhere can profit by the California technique. PUC President R. E. Mittelstadt sums up its advantages in this cogent language: "It speeds up the process of decision by the commission, enabling it to determine whether a rate increase is justified and if so, to authorize it at the time it is needed. Thus the utility's credit is maintained and it is able to finance expansion at lower cost, which is to the advantage of the rate-paying public."

Speak to 500 or 500,000

NOT long since our national contemporary, *Electrical World,* carried an editorial urging utility executives to make more public speeches and to publicize them with mimeographed handouts to newspaper men. The editorial pointed to the able manner in which advocates of public power had followed this practice over the years and to the success they had achieved in publicizing their cause. We have on our desk ten or a dozen mimeographed talks from the recent National Electric Consumers Conference called in Denver by the National Farmers Union. There are also scores of newspaper clippings on the meetings. Public power was praised to the skies and private power caught hell. Which prompts us to quote from Henry Brooks Adams: "The difference is slight, to the influence of an author, whether he is read by five hundred readers, or by five hundred thousand; if he can select the five hundred, he reaches the five hundred thousand."

More Power for the Northwest

DEVELOPMENTS have moved swiftly in the Pacific Northwest to implement the Eisenhower administration's declaration that local interests should assume responsibility for local power supply. Six investor-owned utilities last month announced plans to organize a generating corporation to undertake immediate development of some of the major Columbia Basin power projects. Several PUDs in Washington have done the same.

In taking over responsibility for the future power supply of the region, these groups anticipate federal cooperation in those all-purpose projects which involve flood control, navigation or irrigation benefits. The federal government is expected to assume the costs of such phases of any project. Aim of the groups is to insure adequate power supplies for the next 20 years under local sponsorship rather than national.

Action followed the announcement of the joint enterprise almost immediately. Five of the six utilities, according to J. E. Corette, president of Montana Power and spokesman for the group, will seek preliminary permits from the Federal Power Commission for two power projects on the Clearwater River in Idaho. Cost is estimated at $305,000,000 including provisions for flood control. Capacity will be 536,000 kw.

EDITORIAL VIEWS

The resurgence of local enterprise in power development in this region is heartening. The Pacific Northwest stood in a fair way to become an economic dependency of the federal government so long as it depended upon Washington to provide the major share of its electric generating capacity. The threat of a federal power monopoly with its attendant economic subservience to federal bureaucrats will disappear now that local interests have assumed their traditional responsibility of providing for local needs.

Hawaiian Older Brother

AN admirable relationship among the various utilities on the several islands of the Hawaiian chain is evident to the mainlander. To the islanders themselves there is nothing extraordinary about it for friendliness and cooperation are natural to them always.

Most of the utilities began as an extension of service from a sugar mill to its surrounding community. Now steps are being taken to link these systems together for improved service and greater coverage.

On Oahu the Hawaiian Electric Co. is like an elder brother, for in capacity and in coverage of the territory it is the successful and mature public service company of the islands. Yet it wears this distinction with such friendliness and consideration that the smaller neighbors look up to it as youngsters do toward an admired older brother. When they need advice and help the elder brother is ever there, willing and helpful. There is none of the boss or the bully sometimes found between brothers. In emergencies it has materials, men and facilities. To meet problems its men have experience and know-how to lend graciously.

What is so commendable is the mutual respect and admiration all the utility people have for each other and the industry of which all are a part. The famous Hawaiian friendliness has depth. It goes beyond the leis and greetings so characteristic of Honolulu to real helpfulness.

You Can Say That Again

WHAT'S ahead for our employees? The electric industry is a rapidly growing industry, growing at the long-time rate of six per cent per year, and in the last ten years it has averaged 8.1 per cent. The industry, however, has not reached maturity. Such rapid growth opens up unlimited opportunities for our employees to grow in responsibility and to compete in achievement. We should maintain good working conditions which are inherent in our industry and not permit seniority considerations alone to stand in the way of opportunity for younger employees if we are to obtain desirable new employees for our ever-growing ranks. History shows that in the electric industry, perhaps more than in any other, the leaders of today have worked their way up company ladders. Our employees must constitute a happy family — always courteous to our customers, in whose eyes each is the company — with the self-satisfaction of pride in their work and their company. As executives we must continually promote a spirit of teamwork and helpful cooperation from top to bottom through informing our associates about company policies; about what is going on within the company, the community, the state and the nation affecting the company's business; about new uses for electricity, prospective load growth, construction plans, new power sources in prospect, safety and other operating matters; and about competition from government programs. In brief we should consistently and intelligently strive to reach the ideal of a team of willing, capable, cooperative and well-informed employees, happy in their work and animated by the incentive to earn further advancement.—Walter H. Sammis, president, Edison Electric Institute.

THE MONTH IN BRIEF

"Partnership Plan" Endorsed

Six Northwest power companies are ready to enter into partnership with the federal government in construction of hydro projects enabling them to supply the total power requirements of their customers. This announcement was made on Dec. 7 in Seattle following a meeting called by governors of the four Northwest states and includes Idaho Power, Montana Power, Mountain States Power, Pacific Power & Light, Portland General Electric and Washington Water Power Companies. These companies have joined in an informal organization and have been studying prospective power sites for the past three months, it was stated. They presumably would buy stock in a generating company and issue debenture bonds. The plan calls for the companies to finance the power phase of a project, if the federal government will bear such incidental costs as can be charged off to flood control, navigation, recreation, etc. A joint project possibly could begin producing power by 1960, the first year in which a shortage is anticipated in the Northwest under present construction schedules, according to J. E. Corette, president of Montana Power, spokesman for the group. Projects under study would not conflict with dams proposed by other agencies, he said. Attended by public and private power producers and distributors, the Seattle conference resulted in formation of a policy committee including the governors, a representative of the British Columbia provincial government, members of the Northwest Power Pool, Department of Interior, Corps of Engineers, FPC and the chairman of the Interstate Compact Committee.

Joint Development Planned

In line with their pledge at Seattle, five Northwest power companies late last month filed joint application with FPC for preliminary permit to investigate development of 536,000 kw at Bruce Eddy and Penny Cliffs on branches of the Clearwater River in Idaho. The application was made by Montana Power, Pacific Power & Light, Portland General Electric, Washington Water Power and Mountain States Power Companies, which have an installed generating capacity of 1,400,000 kw and estimate a joint need for between 150,000 and 200,000 kw of new plant capacity annually to meet the area's growth. Operation of the joint plants would be coordinated with other river development through the Northwest Power Pool. The proposal, estimated to cost $305,000,000 for all features including flood control, was worked out by the Army Engineers to overcome objections to earlier plans for developing the Clearwater. The new plan keeps the south fork open for unobstructed fish migration and makes unnecessary relocation of the town of Kooskia. It calls for a 576-ft rockfill dam at Bruce Eddy, with power installation of 244,000 kw and 1,430,000 acre-ft of useful storage, and a 596-ft dam at Penny Cliffs, with 292,000 kw and 2,300,000 acre-ft of storage.

Puget Power Files Application

Puget Sound Power & Light Co. has filed application with FPC for a permit to study a run-of-the-river dam on the Columbia at Wells, about 60 miles north of Rock Island Dam. The proposed dam would back the Columbia substantially to the base of Chief Joseph Dam, about 30 miles upstream. A dam proposed by Chelan PUD downstream at Rocky Reach, between Wells and Rock Island, would back water approximately to the Wells site. The Army Engineers' 308 report estimated a dam at this site would have an initial capacity of 400,000 kw and an ultimate capacity of 600,000 kw, at a cost of $193,000,000.

Valuation Set on Utility System

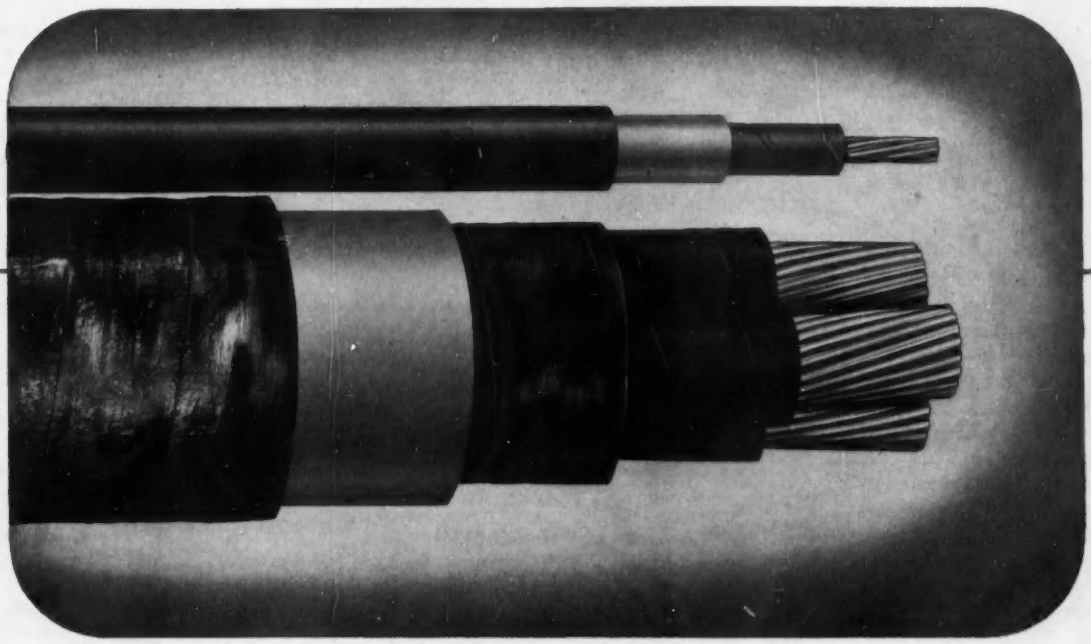
Valuation of $3,580,405 was set by a U. S. Federal Court jury at Pendleton, Ore., on properties of the California-Pacific Utilities Co. Properties involved in condemnation proceedings brought by the Union County PUD include all California-Pacific's Union County system except that in the municipalities of Elgin and Island City, where the people have consistently voted down attempts to put them in the district. The PUD had estimated combined value and severance damages at between $1,800,000 and $2,200,000. It had approved $925,000 in revenue bonds; would have to hold another election to go ahead with the purchase.

Rate Hearings Simplified

First to benefit from the California PUC's simplified hearing procedures, Coast Counties Gas & Electric Co. last month was granted rate increases totaling $200,500 annually. The decision was announced in a little more than six months after application and with only three hours of formal hearings. Since the end of World War II, electric rate increase cases before an overloaded commission have dragged on as long as a year and a half, often working serious hardship on the utility. Early last year in an attempt to expedite the processing of rate applications, the commission developed new methods. Informal conferences are now held between utility representatives and PUC staff members in an effort to work out minor differences. Copies of the company's exhibits are sent to the city and county officials and other interested parties. The commission then calls a prehearing conference, again informal and open to the public. After this meeting, only fundamental questions are left for full development in the hearing record and for decision by the commission. The increase gives Coast Counties a 5.75% rate of return. The original application last May asked for $440,000, a 6.25% rate of return. However, after informal meetings with the commission, the company decided that in the interest of getting a quick decision it would settle for the lesser rate. It then prepared its exhibits to request a $200,500 increase, which will maintain the 5.75% rate established in December 1952.

ROEBLING PROTECTIVE COVERINGS ON LEAD SHEATHED CABLE

for utilities, chemical plants and the petroleum industry



LEAD SHEATHED CABLES used in certain applications by public and private utilities, chemical plants and the petroleum industry are often impaired by electrolysis or chemical corrosion. But such corrosive action can be effectively reduced, and cable life extended, by using Roebling Paper Insulated and Varnished Cambric Cables with either of two outer protective coverings.

One of these coverings is an extruded thermoplastic sheath employing a special high-molecular weight polyethylene. The other is ROESHEATH, built up of neoprene and neoprene-filled fabric tapes and vulcanized directly over the lead sheath. Both coverings not only provide essential protection, but, in some cases, may permit the thickness of the lead sheath to be reduced.

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JAR ROEBLING

Why L-M Round-Wound Transformers Have Such High Short-Circuit Strength

by **JAMES G. EVERHART**
Chief Engineer
Transformer Division
Line Material Company

One of the desirable characteristics of L-M Round-Wound transformers is their exceptionally high short-circuit strength. Partly this is inherent in the way we wind round coils on a wound core. But further, this strength arises from the exceptionally good mechanical design.

Effects of Short Circuits

Short circuits exert two forces—radial and axial. Under radial forces, rectangular coils tend to assume a round shape. Being already round, the coils on Round-Wound transformers resist these radial forces much better than do rectangular coils. (Figs. 1 and 2).

Axial forces tend to telescope the windings. Although failure is progressive, it can occur almost instantaneously. If the coil starts to telescope, the electrical centers of the coils are abnormally displaced. This results in a greater axial component which increases the force and the movement, leading to complete failure. (Figs. 3 and 4).

In larger transformers the mechanical forces involved can amount to thousands of pounds. Therefore in Round-Wound transformers we pay special attention to providing a mechanical structure sufficiently strong to support and hold the coils in position in the assembly.

This structure requires a rigid steel frame, firmly tied together vertically (Fig. 5), and properly designed blocking (Fig. 6). Even leads must be strongly clamped (Fig. 7), since great mechanical forces may exist between adjacent leads.

Varnish Selection

Correct application of the proper varnish provides a bond between layers of insulating paper and coil sections which contributes to short-circuit strength. We have developed a variety of tests for varnish, including a mechanical test of bonding strength. (Fig. 8). These tests enable us to select those few varnishes which combine the highest mechanical and electrical strength with other desirable qualifications.

The overall result of design, construction, selection of materials, and careful manufacture has given L-M Round-Wounds unusually high short-circuit strength, which contributes to an extremely low rate of failure.

136

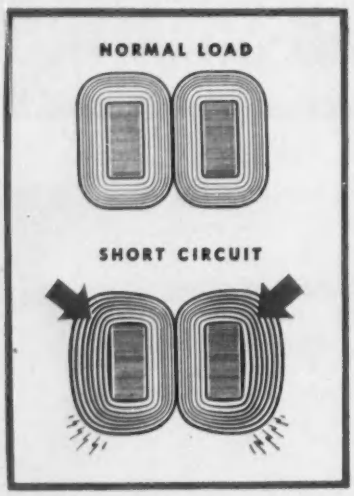


FIG. 1. Radial forces existing under short-circuit currents make rectangular coils tend to become round. The forces may be violent enough to damage insulation, or may completely destroy the coils.

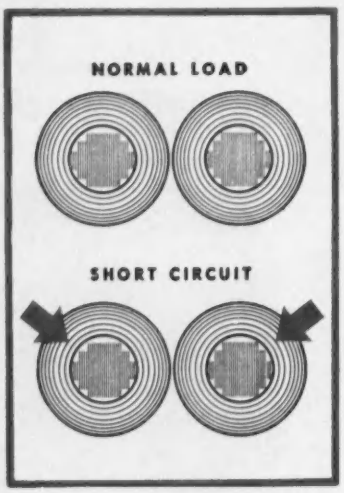


FIG. 2. Since the coils of Round-Wound transformers are already round, short-circuit radial forces cause no distortion. Thus Round-Wounds have inherently higher short-circuit strength.

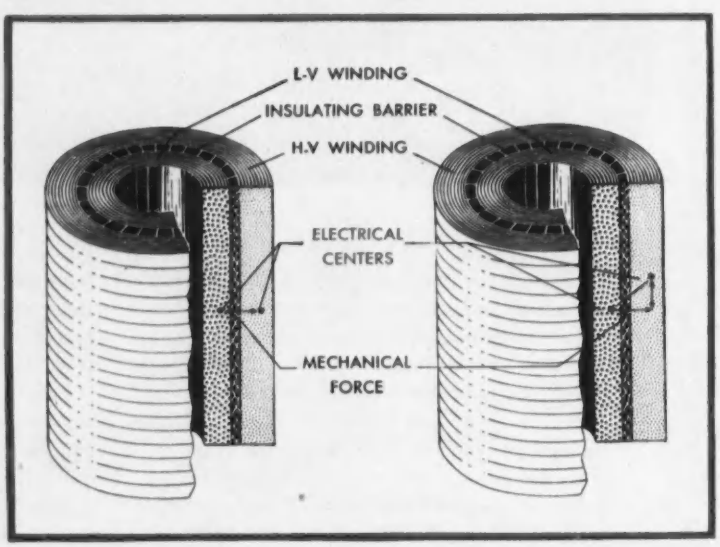


FIG. 3. Diagrammatic vertical section of coil showing primary and secondary electrical centers on the same horizontal plane. Under short circuits, all forces are radial and windings tend to repel each other in a horizontal plane. But even though coils can be designed with the electrical centers on the same plane, manufacturing tolerances cause some variations; and tap changer operations will cause some unbalance.

FIG. 4. With electrical centers displaced vertically, the force between the centers has both radial and axial (vertical) components. Axial forces cause the windings to telescope and separate vertically. Any displacement increases the vertical force component between them, which progressively compounds to complete destruction of the coils. The rigid construction of Round-Wound transformers prevents the slightest movement.

LINE MATERIAL Transformers

Compare the Things That Count

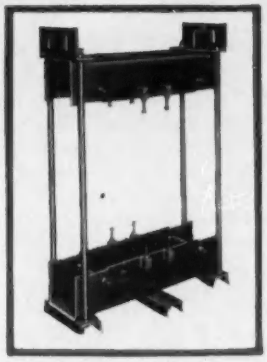


FIG. 5. Heavy steel frame provides a rugged mechanical structure that is firmly tied together vertically. It is sufficiently strong to support and hold coils in position in the assembly.

FIG. 6. Sturdy kiln-dried, oil-impregnated, shaped maple blocks give maximum contact and support to coil-edge surfaces. These are assembled and clamped so that they cannot move out of position under short-circuit forces.

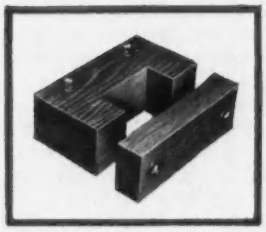


FIG. 7. Under short-circuit conditions, great mechanical forces exist between adjacent leads—especially in large transformers. These leads are strongly clamped so they cannot be harmfully displaced.

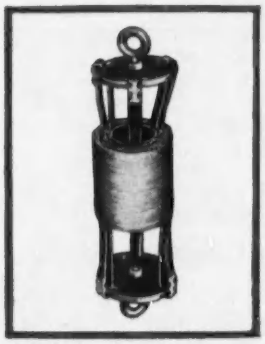


FIG. 8. Here is a coil impregnated with a test varnish set up for a pull test—which will determine whether the varnish has adequate bonding strength. This is just one of the tests L-M has developed to select the best varnishes for Round-Wound transformers.

"Round-Wound" is a Line Material Company trademark

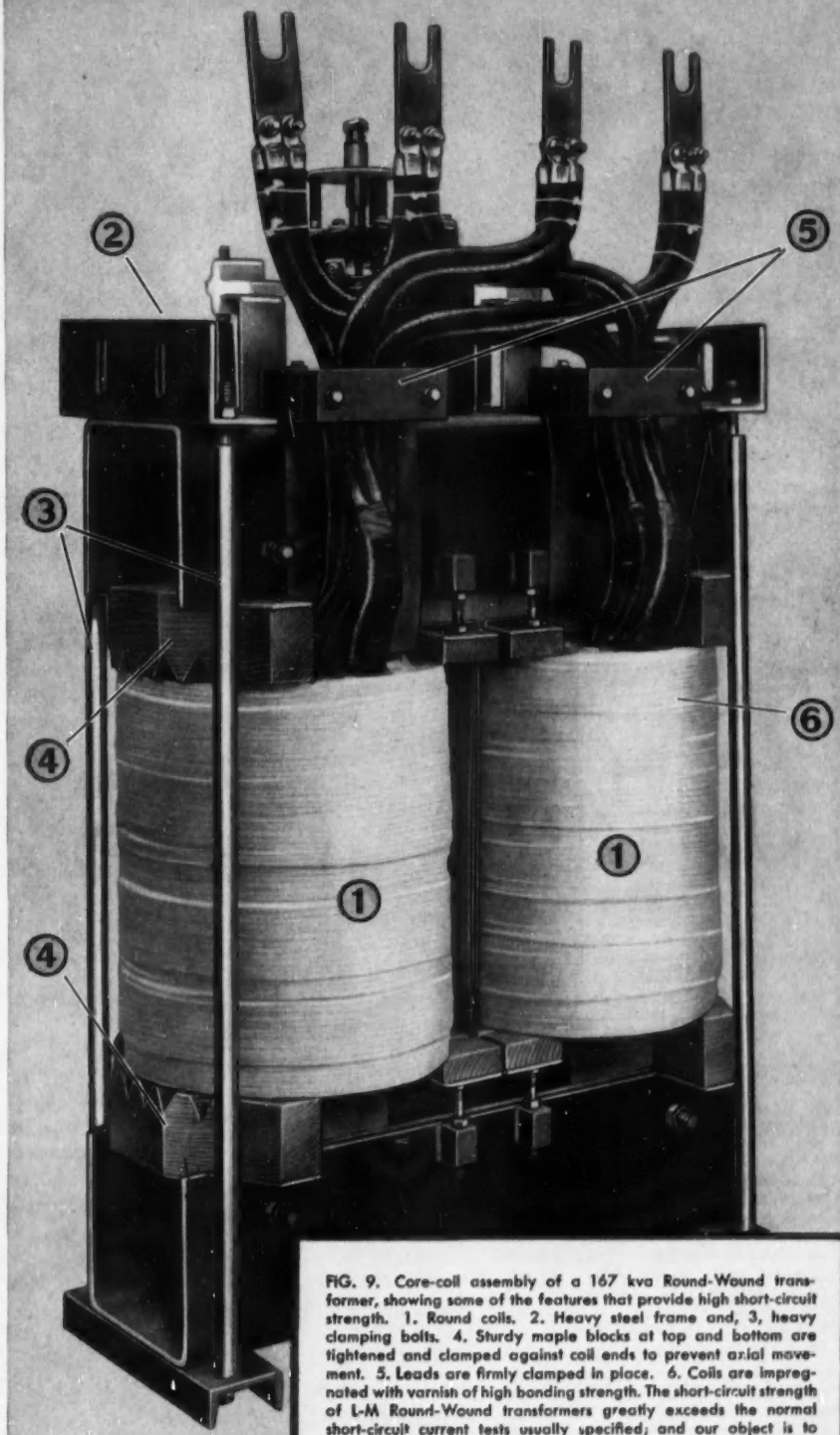


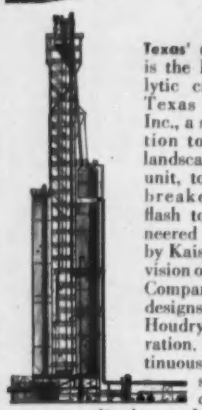
FIG. 9. Core-coil assembly of a 167 kva Round-Wound transformer, showing some of the features that provide high short-circuit strength. 1. Round coils. 2. Heavy steel frame and, 3, heavy clamping bolts. 4. Sturdy maple blocks at top and bottom are tightened and clamped against coil ends to prevent axial movement. 5. Leads are firmly clamped in place. 6. Coils are impregnated with varnish of high bonding strength. The short-circuit strength of L-M Round-Wound transformers greatly exceeds the normal short-circuit current tests usually specified; and our object is to build transformers that will withstand dead short-circuit currents.

Get Complete Information About L-M Round-Wound Transformers

We'd appreciate an opportunity to give you full information about the many desirable characteristics of these outstanding transformers. We'd like you to compare them with others—"Compare the things that count!" Ask the L-M Field Engineer for information; or write for new Bulletin DT-1 to Line Material Co., Transformer Div., Zanesville, Ohio (a McGraw Electric Company Division).

what's NEW in Engineering

An ingenious new alarm system which automatically sounds a warning when overloaded industrial equipment gets too hot, is said to be the answer to the problem of having to feel bearing cases and check thermometers scattered over a wide area. The moment a motor gets "too darn hot", a bulb lights up, and a central monitor gives out an audible alarm.



Texas' newest landmark is the Houdriflow catalytic cracking unit of Texas City Refining, Inc., a spectacular addition to the southwest landscape. The cracking unit, together with visbreaker and vacuum flash tower, were engineered and constructed by Kaiser Engineers Division of Henry J. Kaiser Company from the basic designs prepared by the Houdry Process Corporation. A new-type continuous bulk handling system for fresh catalyst and a new, centralized control system were also designed and built by Kaiser Engineers' process specialists.

To be published January 1, 1954 by McGraw-Hill is the Third Edition of **Formulas for Stress and Strain** by Raymond J. Roark, Professor of Mechanics, University of Wisconsin. This thorough revision of a working handbook for engineers concerned with machine and structural design contains a summary of important formulas, facts and principles pertaining to strength of materials.

An indication of Kaiser Engineers' activity is the fact that more than 6,000,000 miles have been flown by key personnel, staying in touch with far-flung activities in widely diversified engineering fields. When you have a problem in design, engineering or construction, call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

THIS MONTH'S NEWS

Bonneville Policy Told By Interior Secretary

Secretary of the Interior Douglas McKay expects the Bonneville Power Administration to meet its responsibilities as an operating "wholesale utility company" in the Pacific Northwest but there will be no more promotion of public power, he told reporters at Portland during a holiday visit.

"Bonneville wasn't planning regional development under the Democratic administration, it was promoting public power, and that is what is being stopped," he said.

His comments were seen as a modification of an earlier policy statement by Undersecretary Ralph A. Tudor, who said that BPA's planning and engineering activities would be cut to the bone.

"The Bonneville promotion tail had come to wag the power-selling dog," McKay continued. "We are planning only to curtail Bonneville's promotion activity. It will still have a certain amount of planning to estimate requirements on various parts of the system. It will have to meet its responsibilities as a member of the Columbia basin interagency committee."

Another Company Signs Bonneville Power Contract

Puget Sound Power & Light Co. has signed a 20-year contract with the Bonneville Power Administration, similar to contracts reached with four other private companies. President Frank McLaughlin stated: "Fundamentally the contract leaves much to be desired" but had to be signed "to assure Puget and its customers their pro rata share of such federal power as may be available from time to time."

Washington Commission To Headquarter in Seattle

The new Washington State Power Commission has decided to establish headquarters in Seattle as soon as office space can be obtained.

Created by the 1953 state legislature and activated by Gov. Arthur B. Langlie several months ago, the commission will not have a full-time managing director until February, when J. Frank Ward, formerly City Light superintendent at Tacoma, takes office.

During its first meeting with Ward, the commission concluded that one of its primary jobs will be to try to remove objections to a number of potential power plants.

"There are sites for power dams remaining in this state," the commission earlier had been told by E. R. Hoffman, retiring superintendent of Seattle City Light, "but neither we nor others can go in there because the people object. Sometimes the objections are by the fisheries people, sometimes by others. But in any event the objections prevent development of the sites."

State Supreme Court Upholds Tacoma's License for Dams

Refusal of the Washington State Supreme Court to rehear an action challenging the City of Tacoma's right to build two hydroelectric dams on the Cowlitz River removes another obstacle toward construction of the $146,000,000 project.

The court on Dec. 14 stood by its 6 to 3 decision of Oct. 14 holding that the city has a valid license from the FPC to build the dams.

Attorneys for the state game and fish departments, who filed the original suit, have indicated, however, that they will appeal the decision to the United States Supreme Court.

Still to be heard in Thurston County Superior Court is a suit brought by a group of Tacoma taxpayers which challenges the bond issue to finance the dams.

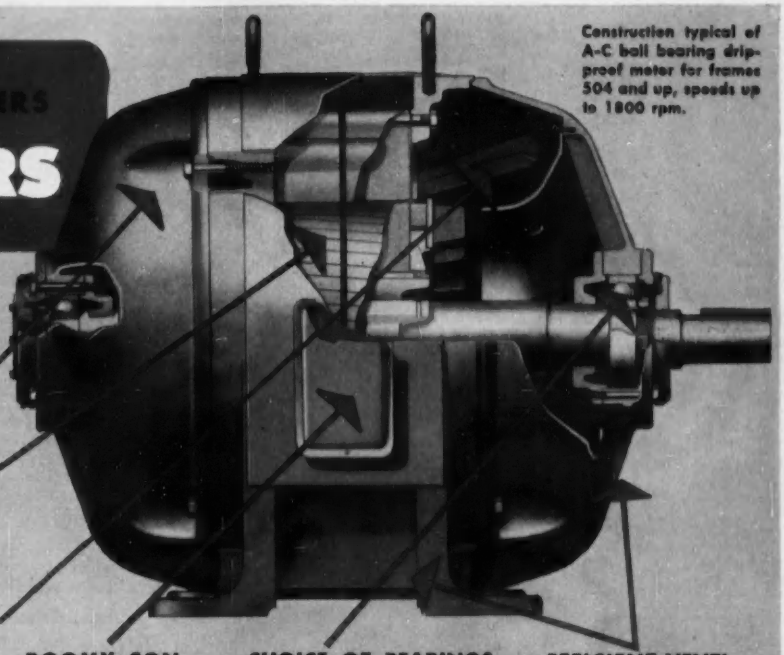
In addition, the Tacoma Public Utilities Board has announced its intention of re-examining the project in view of increased costs. Resignation of J. Frank Ward, Tacoma City Light superintendent, to become managing director of the Washington State Power Commission cost the project one of its best spokesmen.

PS of Colorado Purchases Small Utility Company

Arvada Electric Co., a privately owned small utility island almost surrounded by Public Service Co. of Colorado, was purchased from its owners, Charles S. Stern, president and general manager, and Harry Adler, vice-president and secretary, by Public Service Co. of Colorado Nov. 27 and became a part of the Public Service system Jan. 1. Both Stern and Adler plan to devote their time to their many other business interests.

ALLIS-CHALMERS

MOTORS



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2 Complete Drive From One Source Allis-Chalmers can supply your complete drive — control — motor — *Texrope* V-belt drive — from one convenient source.

3 Competent Engineering Help Your local Allis-Chalmers District Office representative or Authorized Distributor will be glad to help you select exactly the right motor for your needs. For additional information, write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6052.

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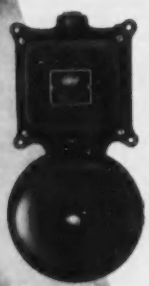

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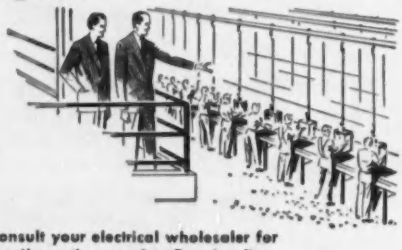

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STOCKHOLDERS OPPOSE PUGET DECISION

A stockholders committee of Puget Sound Power & Light Co. is circulating a letter charging that the merger proposal from Washington Water Power Co. was permitted to lapse Nov. 19 although 25% of Puget's stockholders favored it.

The letter, written by Francis Currie, New York attorney who is secretary of the stockholders committee, declares that by Nov. 19 holders of 500,000 shares of Puget stock had indicated in writing their support of the merger. Currie termed this "a truly remarkable result in view of the limited time and resources available to the committee, which did not even have a stockholders list." He stated that "efforts will not be abandoned to bring about a merger."

The letter said: "One of the main objectives of this committee has been and continues to be active resistance to any acquisition of Puget Sound properties by public power bodies." It added that President Frank McLaughlin's declaration of the company's independence "is viewed with great skepticism."

Alaskan Fish Interests Oppose Dam Construction

Controversy between fisheries and power interests, long concentrated in the Pacific Northwest, has been extended to Alaska as the result of the Harvey Aluminum application to the FPC for a preliminary permit to build a hydroelectric dam on the Copper River upstream from Cordova.

The Alaska Fisheries Board has filed an objection to the permit and at least one of its members is indignant because the territorial government wouldn't protest on behalf of the territory. A formal protest to the FPC by the Territory of Alaska is necessary to carry any weight, according to Ira Rothwell of Cordova, board member.

Gov. B. Frank Heintzleman answered that protests against the permit are "premature," declared he has suggested to the FPC that the company be required to make preliminary surveys for fish ladders, elevators, escalators or some other mechanical means of moving fish without injury.

The dam would be constructed 85 miles upstream from the mouth of the river, forming a barrier to runs of spawning salmon to major salmon-spawning areas of the Copper River system. The aluminum company is studying the dam project in connection with a proposed aluminum plant.

Dependable

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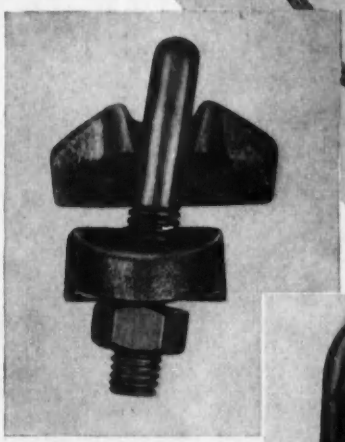

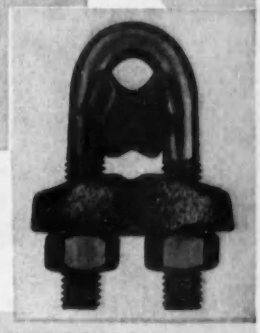

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Cat. No.	# Rating lbs.	Strand Dia. Range	Wgt. Per C Pcs.
PAX64	7,500	3/16"-7/16"	55 lbs.
*PAX67	12,500	1/4"-1/2"	122 lbs.
*PAX64C	7,500	3/16"-7/16"	67 lbs.
PAX67C	12,500	3/16"-1/2"	142 lbs.

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#PAX64 & PAX64C Based on tests with nuts tightened to 45 ft./lbs.
PAX67 & PAX67C Based on tests with nuts tightened to 85 ft./lbs.

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Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill. • S. H. McCoin, Knoxville, Tenn. • E. A. Thornwell, Inc., Atlanta, Georgia • J. P. Voight, Summerville, S. C. • Waltham, DeWitt & Krusi, San Francisco, Calif. • L. G. Wendegatz, Kansas City, Mo. • Williams Sales Co., Fort Myers, Fla. • Williamson Sales Co., Shreveport, La. • O. C. Witte Co., Detroit, Mich.

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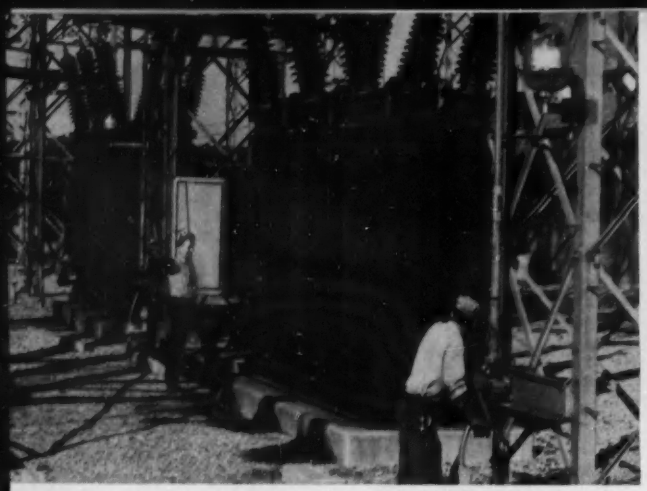
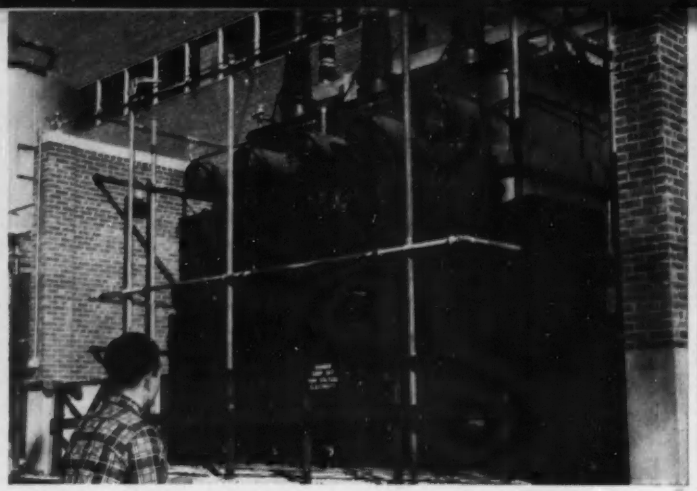
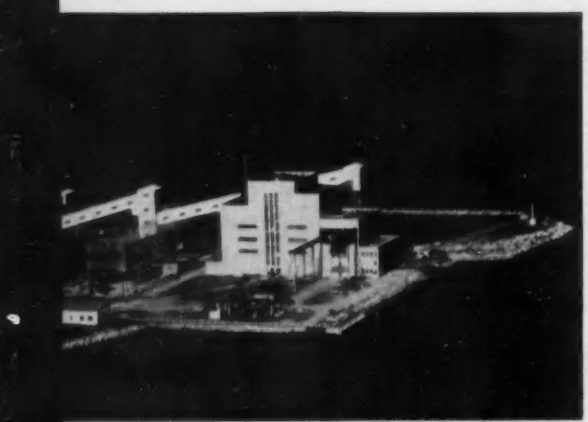


COMPACT SWITCHYARDS can be supplied by G.E., even including yard lighting. Here are two of the three 115 KV-3,500,000 KVA oil circuit breakers at Danskammer Point Steam Station.

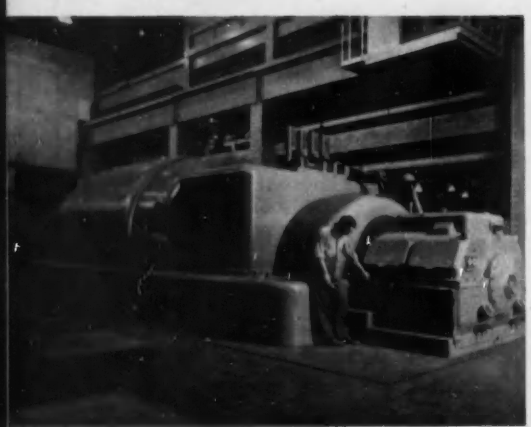


ENGINEERING COORDINATION means simpler installation of major equipment like this 84,000 kva forced-oil-air-cooled transformer. G-E Product Specialists follow selection and installation of equipment.

G-E Project Service Helps Save Manhours,



THIS IS DANSKAMMER POINT Steam Station near Newburgh, N. Y., on the west bank of the Hudson River. G.E. supplied major electrical equipment.



PRESENT 66,000 KW TURBINE-GENERATOR, installed under the supervision of G-E field engineers. Second unit is an exact duplicate of this one.

Engineering coordination, on-time shipments speed construction at Danskammer Point

General Electric Project Service is helping to save time and money for Central Hudson Gas & Electric on their expansion at the Danskammer Point Steam Station. Working closely with Central Hudson and Burns & Roe (engineers and constructors) a General Electric Project Team follows every phase of engineering, manufacturing, and delivery of substantially all the major electrical equipment to be used in the 66,000 kw addition to be completed early in 1954.

A Project Team captained by the G-E sales engineer and consisting of an application engineer, expeditor, and system and product specialists was also following the first unit, built in 1951, to keep delivery, and thus construction, on schedule—reducing costly overtime and conserving engineering talent.

HERE'S HOW YOU BENEFIT FROM PROJECT SERVICE

Whenever you have a building or expansion program involving major pieces of equipment, Project Service can help you and your consulting engineer. A Project Team will:

SIMPLIFY ORDERING OF EQUIPMENT, either purchased directly or through your consulting engineers or machinery manufacturer.

CONSERVE YOUR ENGINEERING TIME by handling many important electrical details, relieving you and your consulting engineer.

COORDINATE EQUIPMENT DESIGN to insure maximum utilization of equipment, throughout the entire project.

SPEED CONSTRUCTION by insuring the arrival of equipment exactly as it is needed for greatest efficiency.

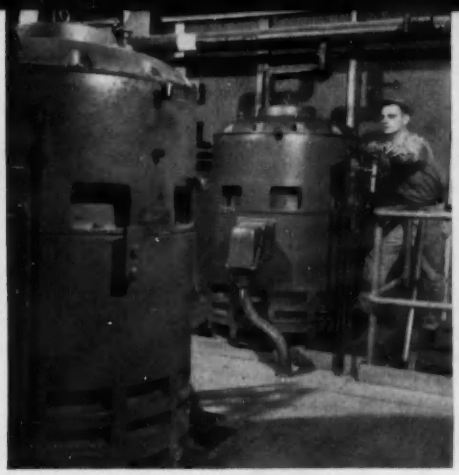
SUPERVISE INSTALLATION to insure minimum start-up time and help train operators.

For details on how Project Service can help you, contact your G-E Representative or write for GEA-6032, to Apparatus Sales Div., General Electric Co., Schenectady 5, N. Y. 302-3

MORE POWER TO AMERICA

GENERAL ELECTRIC

G-E 3600 AMP ISOLATED PHASE BUS and surge protective equipment, well planned in the early stages, goes in fast.



PROJECT SERVICE INSURES complete electrical coordination of station auxiliary equipment, such as these 125 hp circulating water pump motors.

PACKAGED CONTROL CENTERS, such as this, simplify operation, compactly combine related elements.

Cut Costs for Central Hudson Gas & Electric

PROJECT PROGRESS on second unit is discussed by C. B. Wilson, G-E Application Eng., Ralph Roe, Pres., Burns & Roe, Engineers and Constructors, W. West, G-E Sales Eng., and R. B. MacGuinness, V. P. of Central Hudson

RATE INCREASES GRANTED PUBLIC SERVICE OF N. M.

Public Service Co. of New Mexico was granted rate increases totaling $429.000 a year in an order filed by the State Public Service Commission. New schedules were filed by the company and will go into effect 30 days after they are approved by the commission.

The utility, which had sought rate hikes totaling $1,174,000, also was permitted to integrate its electrical system and charge uniform rates in Albuquerque. Las Vegas and Santa Fe. The PSC order made no rate changes at the fourth city served by the utility, Deming.

PSC's 182-page report, which required four months to write, held that a return of 6.3% for the utility is "just and reasonable." Public Service Co. had requested a return of 6.85% on its investment in water and electric properties in New Mexico.

The company provides electric service in all four cities and water service in all but Albuquerque (where the water system is municipally owned).

Albuquerque will bear the biggest burden of the rate increase. Not only does this city have the lowest present rates in the utility's system, it also has about 80% of the company's electric consumers.

The company had requested $968,-500 in additional revenues from its electric customers. The PSC order granted it $312,000. The requested amount would have produced $551,-062 after taxes; the increase granted will bring $200,000 a year after taxes.

Electric Rates Reduced By Seattle City Light

Electric rates at Seattle were reduced Dec. 1, saving users approximately $1,000,000 annually. Residential customers will receive about $410,000 and commercial customers $590,000.

Declared to be the lowest in the nation, the new residential rate will be $5.14 for 500 kwh instead of $5.35. The new ordinance provides a general reduction for all residential customers on the "standard" rate using more than 60 kwh a month. These customers will save up to $6.48 a year, depending on monthly consumption. Residential customers who use more than 1,500 kwh per month and are affected by the "seasonal-use" clause will save $7.70 or more a year in addition to the regular residential saving.

Revisions in commercial and industrial rates were planned with a view toward simplification and to make them more equitable, rather than to give a uniform rate reduction, it was stated. As a result, the smaller commercial users, with loads under 15 kw, will receive no reduction, while savings for larger commercial customers will reach as high as 20%. Most of the small consumers received sizable savings in the 1952 rate cut, it was pointed out. Also unaffected are customers on commercial waterheating and cooking rates or special industrial rates.

Copco Granted Rate Increase To Give Six Per Cent Return

Oregon and California Public Utilities Commissions have granted California Oregon Power Co. rate increases expected to total $2,100,000 annually. The increase is about $500,-000 short of the amount Copco asked in applications filed last June.

Copco had asked for a 20% increase but the commissions approved 16.12% jumps, designed to give the company a 6% rate of return. The order was effective on Dec. 15.

Uniform Gas Rates Asked For Pacific Northwest

Spokane's Chamber of Commerce has prepared a statement to the Federal Power Commission, urging the commission to establish uniform rates for the entire Pacific Northwest when natural gas reaches the area.

Otherwise, chamber gas advisory committee members said, Spokane and eastern Washington could not hope to compete with the Seattle and Portland areas in attracting industries that use natural gas.

Pointing out that FPC once recognized the importance of uniform electric rates, the chamber's statement says: "In regard to the unit cost of natural gas, we must and can only urge that in all fairness the FPC should consider and treat the Pacific Northwest as an integrated community and establish the same and identical basic take-off rate or rates throughout the area for natural gas."

• **San Diego Gas & Electric** Co. has put into effect a 25% discount system on gas and electric bills of its employees. The plan became effective on December billings as a result of approval by the California Public Utilities Commission of a company request. The request was based on a number of suggestions for adoption of such a plan in the employee opinion survey.

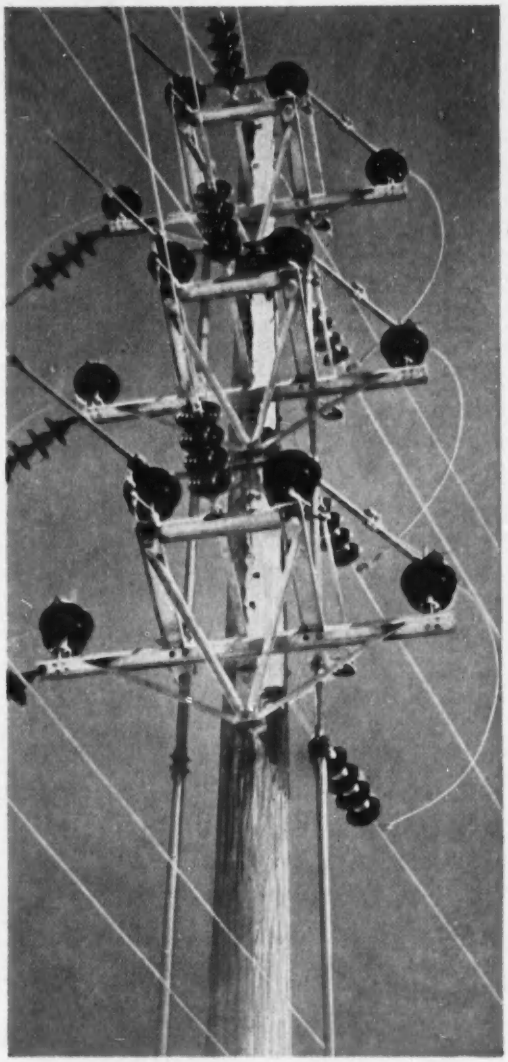
CALL TO WAR SPONSORED BY NATIONAL FARMERS UNION

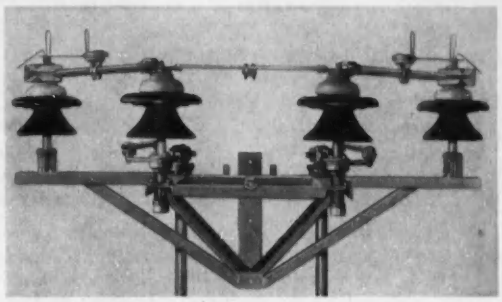
Calling itself the National Electric Consumers Conference, the National Farmers Union sponsored a call to war of all the various public power advocates in Denver Dec. 10-11. (The same National Farmers Union organized the cattlemen's march on Washington to protest to Secretary of Agriculture Benson.) After two days of oratory from public power leaders and two U. S. senators, condemning the policies of the Eisenhower administration, the 636 registered delegates from 29 states voted resolutions calling for: (1) A bigger "consumers" conference in Washington to federate all public power groups and develop united action on each front; (2) put pressure on Congress to approve construction of numerous projects "to assure abundant energy for national defense and full employment"; and (3) to push federal legislation to deny private power companies the rights of free speech or of defending themselves against political action. Among the speakers were Senator William Langer, whose Senate subcommittee is to investigate the power situation; Morris L. Cooke, REA administrator; Senator Robert Kerr; Leland Olds, former FPC head; Clyde Ellis, National Rural Electric Co-op Assn.; Leon Keyserling; S. R. Finley, Electric Power Board, Chattanooga; Robert W. Lucas, editorial writer, *Denver Post*; C. Gerard Davidson and others.

• **On a trial basis,** Pacific Gas and Electric Co. will switch Jan. 1 from a six-day to a five-day work week. Business offices throughout the utility's system will be closed Saturdays, with only emergency service being performed. In the past, employees worked five days a week, but their days off were rotated so a staff was available for work on Saturdays. PG and E told customers they will be able to pay their utility bills on Saturdays at company pay stations in drug stores and other business establishments.

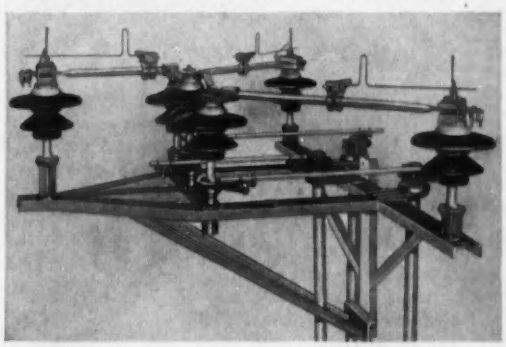
• **Clark County PUD** of Vancouver, Wash., has deferred action on a proposed $400,000 office building, pending "important decisions regarding power supply and wholesale power rates." It received bids for the project last summer but rejected them when they ran considerably above estimates. Now the PUD may find it necessary to join with other public agencies of the state in construction of hydroelectric projects, so doesn't want to go into debt for a building, said Heye Meyer, chairman of the board of commissioners.

MATTHEWS GOABS
CUT SWITCHING COSTS





Shown above is one phase of a Matthews three-phase, two-way Gang Operated Air Break Switch (GOABS). Matthews Goabs are capable of interrupting exceptionally long lines of charging current. In field tests over 65 miles of 66 KV charging current was broken successfully.



With this three-way Matthews GOABS (one phase shown), substation switching, loop inter-connecting or sectionalizing can be accomplished from one switching point. Each set of blades is individually operated.

Matthews GOABS *do* cut installed costs at least 25% because: only one pole per switch is needed . . . minimum right-of-way is required . . . requirements for construction materials are reduced . . . ease of installation saves valuable line-crew time . . . fewer sectionalizing switches are necessary on long transmission lines due to the ability of GOABS to break long lines of charging current. Developed by Matthews less than four years ago, GOABS have been put into service by a great many power companies—in 33 states, Alaska, Hawaii and Puerto Rico. Available in 600 amperes, 15, 23, 34.5, 46, and 69 KV ratings. Write for Bulletin 601-A for more complete information.

MATTHEWS

W. N. MATTHEWS COMPANY

DIVISION OF THE A. B. CHANCE COMPANY

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Salt River Power District has started a monthly orientation program designed to educate and inform new employees. A panel of five employees, each an expert in his field, uses such visual aids as charts, cardboard figures, revolving title disks, colorful designs, blackboard explanations to indoctrinate the trainees. Long in the development state, the program covers subjects that the panel feels the new employee should know—historical development; organization, employment and bidding procedure; safety program; wage and salary; employment benefits. Left, E. R. Wheeler, safety director, explains value of safety program. Right, Don Parlett, assistant to the personnel director, and James Brewer, wage and salary analyst, look over the multicolored disks

Delivery Starts on High-Voltage Cable for Bonneville Lines

Alcoa has begun delivery from its Vancouver, Wash., plant of high-voltage transmission cable for Bonneville Power Administration lines in the Pacific Northwest. The first shipment will be used on lines from McNary Dam to Portland, but most of the 1,327 miles of 345,000-v cable will carry power from Chief Joseph Dam, now under construction, to western Washington. Alcoa has a $3,985,000 contract for the cable. Highest voltage now being used in the Bonneville system is 230,000 v.

Interior Signs One-Year Defense Contract With Aluminum Companies

Favorable water conditions in the Pacific Northwest and new hydroelectric capacity brought on the line during the past year have permitted Interior Department agencies and three aluminum companies to sign one-year agreements that will keep regional ingot production at full capacity for defense needs. (Reynolds Metals, Aluminum Co. of America and Kaiser Aluminum and Chemical normally drop loads of up to 320,000 kw under their interruptible contracts which take effect any time after the beginning of the storage season in September.)

Secretary of the Interior Douglas McKay announced the plan through Dr. Paul Raver after a plea from Arthur S. Fleming, Defense Mobilization Administration director.

Advance release of storage from the vast pool behind Hungry Horse Dam in Montana, up to 200,000 acre-ft, will provide 150,000,000 kwh of energy from downstream installations and add some 15,000,000 lb of aluminum to the nation's strategic metals stockpile.

Kaiser will take about 50% of the energy for its Spokane and Tacoma mills; Alcoa will take 15% at Wenatchee and 10% at Vancouver, Wash.; Reynolds will get 20% at its Troutdale, Ore., plant.

• **Douglas Electric** Cooperative plans to finance construction of 110 miles of distribution lines and improvements for existing facilities with $445,000 borrowed from REA. The new lines will serve 430 customers, including 15 in irrigation areas of the southern Oregon county.

• **Coos-Curry** (Ore.) Electric Cooperative has ordered a survey of rivers in the area for possible hydroelectric development. Coos-Curry is supplied by Bonneville Power Administration lines.

• **California Public Utilities Commission** reports that the new issue of the Public Utilities Code with 1953 amendments is ready for distribution. Copies may be purchased for 50c plus 2c sales tax from the commission, State Bldg., San Francisco 2.

State Supreme Court Upholds Condemnation Action

The Washington State Supreme Court has upheld action of the Chelan County Superior Court in dismissing a petition that would have blocked Chelan County PUD's condemnation of Washington Water Power Co.'s Chelan hydroelectric plant. The county court acted properly in dismissing an action, brought by the power company, seeking modification of a decree of public use and necessity issued to the PUD in 1948, the higher court held.

The power company contended that conditions had changed since the decree was granted, in that the PUD—having acquired additional hydro generating facilities—no longer needed the private plant to supply PUD customers.

• **Residents of Nome,** Alaska, have voted a $225,000 bond issue to purchase the Northern Light & Power Co., which has been providing power to 600 customers and for a street lighting system with a 655-kw diesel generating plant. The company is owned by O. S. Weaver of Santa Barbara, Calif. The Seattle engineering firm of Metcalf & Harstad declared the plant to be worth more than $225,000 and predicted few capital replacements would be necessary in years to come. The system is interconnected with a mining company, which has a 5,000-kw generating plant.

LIGHTING FORECAST FOR 1954
The trend toward more extensive use of "large area," low brightness light sources for commercial interiors will continue in 1954. There will also be an increased demand by architects for engineered lighting equipment that will permit greater flexibility in design. With conservative extrapolating, this would indicate that Sunbeam fixtures will be specified more and more for important lighting jobs.
Sunbeam engineers, geared to anticipate future trends, have designed a complete selection of "large area," recessed, architecturally integrated lighting units. These are available (#3600 SERIES) in 2' x 2', 2' x 4' and 2' x 8' modules having from 4 to 8 lamps and a choice of hinged metal louver, ribbed glass or molded plastic diffusing panels. Also available are louver and plastic shielded 4' x 4' recessed (#3800 SERIES) units.
For tomorrow's lighting, write today for Sunbeam bulletin #707.
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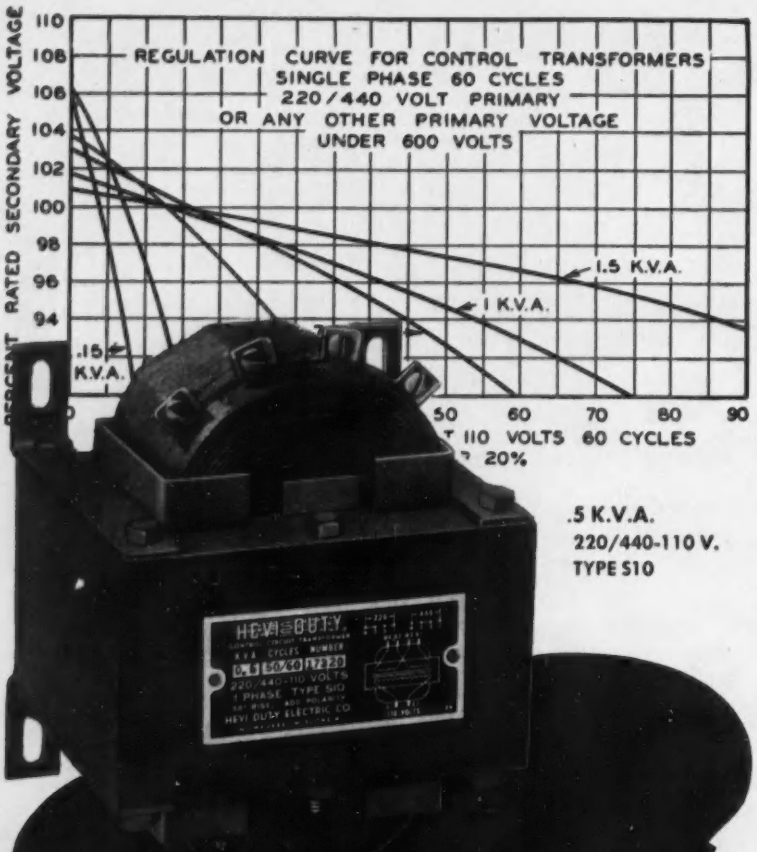
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102
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ARMY ENGINEER COMMENTS ON JOINT POLICY

The joint policy recently formulated by Secretary of the Interior Douglas McKay and Secretary of the Army Robert T. Stevens for land acquisition in dam and reservoir projects will result in the taking of much less land in fee than previously and should materially reduce real estate costs to the federal government, Col. A. N. Matthias, Seattle district engineer, believes after inaugurating the policy on two Washington state projects.

It provides for a minimum of outright purchases of land and places maximum reliance on securing the use of land for reservoir purposes in the form of easements. In the case of the Chief Joseph Dam project on the Columbia River, flowage easements only have been approved for the entire reservoir area with the exception of a few parcels of land adjoining the construction area on which the owners have agreed to an outright purchase. This procedure won general approval at a public meeting in the area.

In the case of Albeni Falls Dam on the Pend Oreille River, landowners whose transactions were not yet completed were queried as to their present attitudes toward outright purchase or substitution of easements for flowage rights. About half of the returned replies have indicated a preference toward completion of outright purchase, said Colonel Matthias.

PG and E Application Would Further Merger Plan

To further its plans for merging with Pacific Public Service Co. and its subsidiary, Coast Counties Gas & Electric Co., Pacific Gas and Electric Co. has filed an application with the California Public Utilities Commission for authority to issue shares of its capital stock in exchange for outstanding shares of preferred stocks in the two utilities.

PG and E filed a similar application early in November asking permission to issue shares of its common stock in exchange for outstanding shares of common stock of Pacific Public Service.

Pacific Public Service has outstanding 298,137.7 shares of $1.30 first preferred stock ($25 par value). Coast Counties has outstanding 124,000 shares of 4% preferred stock, Series A ($25 par value) and 75,000 shares of 4.80% preferred stock, Series B ($25 par value).

No Room for Industrial Complacency

Do you believe that American industry is equipped with remarkably up-to-date and efficient machinery? If you do, you are mistaken. The fact is that a large share of American industry's equipment is ancient, of obsolete design and incapable of attaining the efficiency that is made possible by modern production techniques.

This fact is documented by the Seventh Inventory of Metalworking Equipment, just completed by AMERICAN MACHINIST, a McGraw-Hill publication. In brief, AMERICAN MACHINIST shows that:

1. More than half (56%) of American industry's most basic production equipment—machine tools and metal-forming units—is overage, and much of it is so old that it has very limited usefulness.

2. Since Korea, the situation has become dangerously worse.

Facts vs. Plausible Theory

These conclusions contradict the widely-held impression that America's industrial equipment is in better physical shape than ever before. The prevalence of this impression is not surprising. We, as a nation, have spent about $125 billion for new industrial plant and equipment since World War II. That is more than in any previous period in our history. During 1953, American industry invested $21 billion in new plant and equipment, an all-time high. From this, it would be reasonable to infer that our industrial plant and equipment must be in fine condition.

But the facts do not support that inference with respect to the machine tools and other metalworking equipment that are so crucial to our economy in war and peace. Here are the key findings of the AMERICAN MACHINIST Inventory:

(1) More than one million machine tools—out of a total of less than two million in the metalworking industries—are at least ten years old. Many of these, after day and night operation

during the war years and the recent rush to rearm, are actually much older production-wise than their age in years indicates. In most cases, these machines are unable to produce goods as efficiently as modern equipment can, thus needlessly increasing costs.

(2) Almost one out of five machine tools is more than twenty years old. Most of these machines are so outdated by modern standards that they have little more than scrap value. And an even larger portion of our metal-forming equipment (presses, brakes and shears, bending and straightening machines) has passed the 20-year mark and is beyond normal retirement age.

(3) Two out of three machine tools are of designs predating World War II, though many of them have been built since the war. Thus, two-thirds of our machine tools fail to incorporate the many major postwar improvements in design and operating methods.

(4) Never before has outmoded high-cost equipment been so widely diffused throughout American industry. In every one of fifteen major divisions of metalworking production, more than 45% of the machine tools are at least ten years old.

(5) Not since the depression days of the 1930's has the average age of machine tools risen so rapidly as it has in the past four years. Today, 55% are ten years old or older, compared with 43% just before Korea.

Quality vs. Quantity

Why has the condition of our metalworking equipment been steadily deteriorating since the end of World War II? Part of the explanation lies in the fact that, in the immediate postwar years, production of metalworking equipment lagged behind the production of industrial equipment generally. The larger part of the explanation, however, lies in the tremendous postwar expansion of the American economy. This expansion, which has more than doubled our total industrial capacity, has imposed requirements for metalworking machinery that have been met only by more extensive use of old and obsolete tools. In the critically important field of metalworking, the job of providing up-to-date tools is bigger than it ever has been.

There are those who argue that the time has come to cut back investment in new industrial plant and equipment and divert more of the national income into current consumption. They cite both the great increase in the nation's total industrial capacity since World War II and the fact that some industries now have more than ample producing capacity to meet their needs. But this type of calculation leaves out the *efficiency* of that producing capacity.

The AMERICAN MACHINIST Inventory makes it manifest that in the key field of metalworking we are alarmingly short of first-rate, low-cost producing capacity. If we fail to remedy this situation by speeding the replacement of obsolete tools, it will be at the peril of our prosperity, at the peril of a sustained increase in our standard of living and of our national security.

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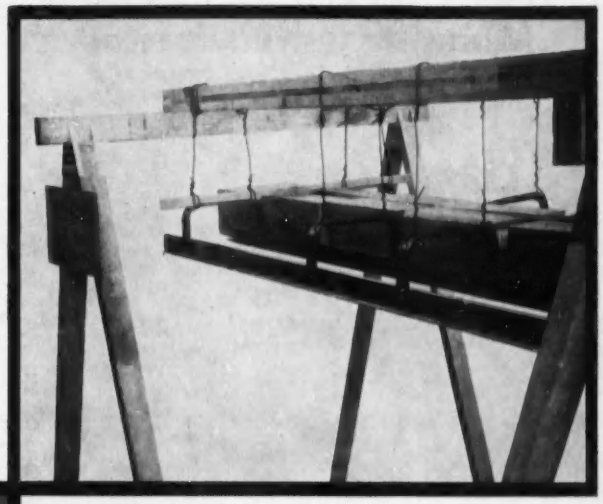
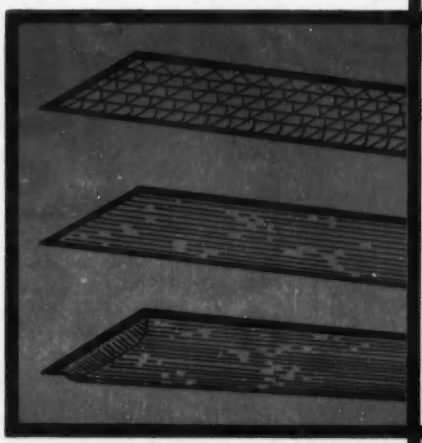


METAL LOUVER

FLAT GLASS

CURVED GLASS



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SIMPLIFIED INSTALLATION

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ARIZONA AUTHORITY MAY BUY USBR LINES IN STATE

Arizona's Power Authority may buy the $50,000,000 Bureau of Reclamation power transmission lines serving Arizona.

A. E. Thomas, chairman of the Power Authority, declined to reveal terms of the proposal, but said suggestions for purchase of the lines, including the backbone transmission line from Hoover and Davis Dams running diagonally across Arizona to Cochise County in the southern section, came at a recent meeting with Interior Department and USBR officials.

Proposal that the authority buy the lines was prompted by Arizona requests for additional substation facilities to serve the Yuma area.

New Mexico Town Rejects Utility Purchase Offer

A $1,400,000 bid by Public Service Co. of New Mexico for the electric properties of Basin Power & Light Co. in San Juan County has been rejected by the Town Board of Farmington.

The town of Farmington controls the Basin Power & Light Co. which serves several northwestern New Mexico communities.

Members of the town board termed the bid as "unacceptably low," and said it would cost the town $1,403,000 to retire now outstanding obligations on the system and put them in a position to sell the properties.

Arthur Prager, president of Public Service Co., said the purchase proposal would be dropped.

Imperial Irrigation District Authorizes Bond Issue

Sale of a $10,000,000 bond issue to finance construction of a hydroelectric plant at Pilot Knob on California's All American Canal has been authorized by directors of the Imperial Irrigation District.

The bond issue, largest in the district's history, was sold to Blyth & Co. and 39 other bonding underwriting firms. The syndicate offered interest rates averaging 3.5308%, representing $6,879,509. The group bid the principal amount plus a $719 premium and accrued interest from Jan. 1, 1954, the date of the bonds.

The Pilot Knob project, which calls for a 33,000-kw plant, has been approved by voters in the district. The bond issue also will pay for transmission and distribution lines.

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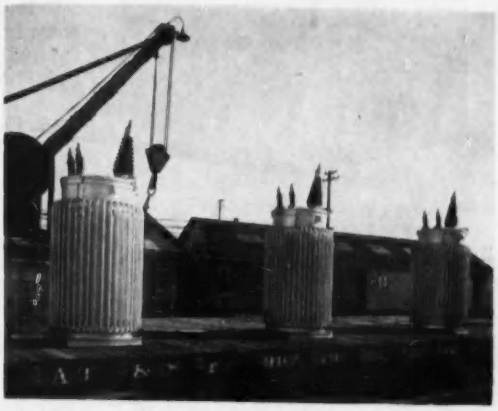

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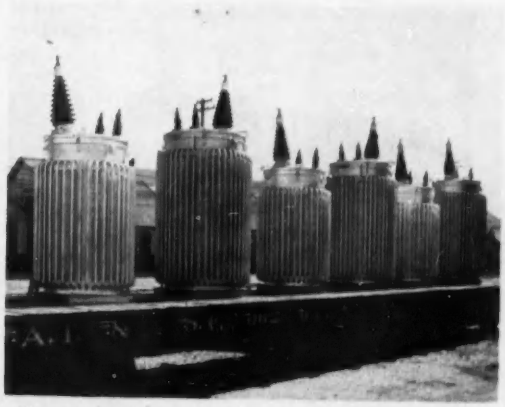

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UTILITIES PLANNING TO TAKE POWER FROM USBR PLANTS

Utah and Colorado private utilities have opened preliminary discussions on construction of transmission lines to take power from two major hydroelectric plants proposed for the Colorado River Basin by the Bureau of Reclamation.

The Glen Canyon project, 13 miles above Lee's Ferry, Ariz., and the Echo Park project in northwestern Colorado were included in a plan recommended to Congress by the Department of Interior. Hearings begin in Washington Jan. 18 on the department's request for authorization of the projects.

Utah Power & Light Co. and the Public Service Co. of Colorado have made preliminary inquiries to the bureau, Reclamation Commissioner Wilbur A. Dexheimer told Denver newsmen.

The utilities have discussed with regional bureau officials in Salt Lake City plans for an integrated system with the utilities constructing 115-kw transmission lines that would have an ultimate capacity of 230 kw, Dexheimer said.

However, Dexheimer said he expects California, Arizona and Nevada will be the chief immediate beneficiaries of power from Glen Canyon because "they can use the power right now."

The Glen Canyon project, as proposed in the Interior Department recommendation to Congress, would cost $421,000,000. Dexheimer said it would have 800,000 kw installed capacity and would provide five billion kilowatts additional power annually for the West. He said power revenues, based on 6 mills per kw, would approximate $25,000,000 to $30,000,000 annually. He said the revenues would pay off the power facilities in 39 years.

The Echo Park Dam would be constructed on the Green River in Dinosaur National Monument near the Utah-Colorado border. It would have installed capacity of 200,000 kw, and would cost an estimated $176,000,000.

Preliminary discussions, Dexheimer said, involve building transmission lines from Salt Lake City to Echo Park, a distance of about 150 miles, and from Grand Junction, Colo., a distance of about 108 miles.

Subject to Congress, Dexheimer said, the bureau itself might construct an interconnecting line between Glen Canyon and Echo Park, a distance of about 450 miles. This would cost about $100,000,000.

Assuming that Congress authorized sufficient funds each year, Dexheimer said, the first power would be available from Glen Canyon about four years after the start of construction. He said the same schedule would apply to Echo Park.

Because the Glen Canyon and Echo Park Dams will be in the Upper Basin of the Colorado River, Dexheimer said he expects Congress will enact some provision giving the Upper Basin states of Colorado, Utah, Wyoming and New Mexico first call on the power from those projects.

However, Dexheimer said bureau studies indicate that the Upper Basin states will not be able to absorb all the power from those projects and that much of the production will be given to California and the other Lower Basin states of Arizona and Nevada.

Region Two Re-established By Reclamation Bureau

California Projects of the Bureau of Reclamation has been re-established as Region 2 upon the recommendation of the bureau's reorganization survey team, which recently reported to Secretary of the Interior Douglas McKay and Commissioner of Reclamation W. A. Dexheimer.

Clyde H. Spencer, who has headed California Projects with the title of supervising engineer since July 20, was named regional director of the redesignated organization.

The order simply re-established the regional title and did not change the organization of the California set-up of the bureau.

Clearwater Plant Put In Operation by Copco

California Oregon Power Co. has put into operation its new Clearwater No. 2 plant on the North Umpqua River, sixth company plant on that stream. Copco General Manager John Boyle reported that the 26,000-kw unit was added to the system on Dec. 4. At full load the plant is capable of producing 30,000 kw.

Chelan PUD Asks Permit for Columbia River Hydro Plant

Chelan County PUD of Wenatchee, Wash., has asked FPC for permission to begin engineering studies preparatory to building a run-of-the-river hydroelectric dam on the Columbia River at Rocky Reach, 10 miles north of Wenatchee, Secretary Kirby Billingsley has announced. The site is above Puget Sound Power & Light Co.'s Rock Island Dam.

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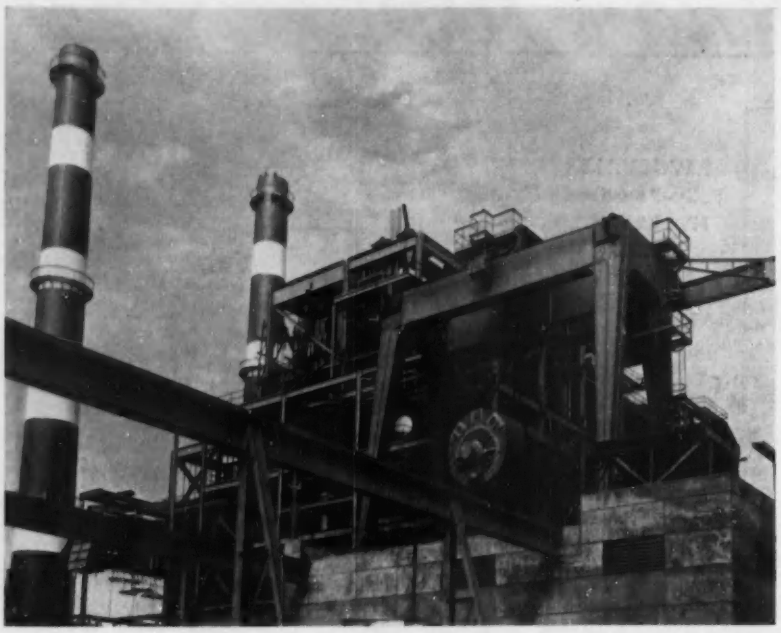

A 100,000-kw generator, so heavy it had to be carried on a special railroad flatcar with 32 wheels instead of the usual 12, was delivered to the Los Angeles Department of Water & Power's $75,000,000 Valley steam plant recently. The Westinghouse unit tipped the scales at more than 200 tons and measured 27 ft long and 9 ft high. The steam turbine section will be shipped separately. Cost of the new generator and an identical unit delivered in June was $4,011,000. They will be in operation in 1954

B. C. Electric Starts New Bridge River Development

Construction has started on a new $8,500,000 plant for B. C. Electric. Tom Ingledow, vice-president and chief engineer of the company, states the plant will utilize water that has already passed through the company's Bridge River power house. It will be located on the Bridge River at the junction with the Fraser.

Emil Anderson Construction Co. Ltd. of Hope was awarded the general contract for the project on a low bid of just over $4,000,000.

The job includes construction of two low-level dams, a 12,000-ft concrete canal and a power station to house a 58,500-hp unit.

The project is part of a $33,000,000 general expansion program announced by B. C. Electric President Dal Grauer.

"Basic idea of the Seton development is to use water from Bridge River a second time," Ingledow commented. "About 80% of the new plant's supply will come from water poured into Seton Lake from our Bridge River station."

The plant will be completed by midsummer of 1956.

• **Benton County** PUD will open bids Jan. 14 at Prosser, Wash., for an office building estimated to cost as much as $200,000. The one-story building, with 12,000 sq ft of floor space, will house offices, an auditorium for public use, meter room, truck space and engineering facilities. A combination heating and cooling system will utilize water heated and cooled by a reverse refrigeration system operating from two wells through floor and ceiling panels. The design will be unusual, with glued-laminated beams and lathe-turned glued-laminated posts. Walls will have aluminum sections into which prefabricated asbestos cement insulated wallboard will be inserted, together with window glass.

• **A new series** of film slides in color, with recorded narration, has been made available by Pacific Gas and Electric Co. as program material for garden clubs, service clubs and other groups interested in community beautification. Arrangements for obtaining the film slide program for public showing may be made at its local offices, the company announced. The program is free of charge. It is part of the company's long-term project to encourage the planting of trees whose roots will not damage streets, sidewalks and sewer lines and that will not touch power lines, particularly during storms.

EMPLOYMENT IS TRIPLED IN ELECTRICAL EQUIPMENT PLANTS

Employment in California electrical equipment plants has more than tripled during the past four years. A report by the state department of industrial relations' division of labor statistics and research shows that, from a total work force of 21,300 wage and salary workers four years ago, employment in the industry rose to reach an all-time high of 67,500 workers at the end of August last year.

During this period employment in the electrical equipment industry expanded at a greater rate than in any other major manufacturing group. In consequence, electrical equipment manufacture rose from the fourteenth largest manufacturing industry in terms of employment to sixth place. The five larger manufacturing industries are, in the order listed, aircraft and parts, food and kindred products, heavy machinery, fabricated metal products, lumber and wood products.

In the electrical equipment manufacturing industry most of the employment growth in the past four years, it is noted, has been in plants manufacturing communications equipment, including electronic products. This segment of the industry now employs about 60% of the electrical equipment workers in the state.

Women workers constitute about one-third of the total work force in the electrical equipment industry. Four years ago women workers accounted for about one-fourth of it.

About three-fourths of all employment in the California electrical equipment industry is concentrated in the Los Angeles metropolitan area. Employment in this area climbed from 13,900 to 51,400 in four years time. The number employed in the San Francisco-Oakland metropolitan area increased from 3,900 to 8,100.

Production workers in electrical equipment plants in the state as a whole earn an average of $81.81 a week. Hourly earnings average $1.96 and the average number of hours worked per week is 41.7.

Electrical equipment production workers in the Los Angeles metropolitan area average $80.66 per week and $1.91 an hour. Working time averages 42.1 per week. In the San Francisco-Oakland metropolitan area earnings average $82.65 per week and $2.11 per hour. The number of hours worked per week averages 39.2.

• **The Institute for Public Utility** Research has been formed in northern California to study operations of public utilities and policy and practice of their regulation.

Symbols of Modernization

Unit load centers are rapidly becoming accepted as the modern way to distribute power inside an industrial plant. This frequently involves using voltages as high as 17,000 volts. That's too high a voltage to be trusted to just any ordinary cable. You can't afford mediocrity in these important cables. Simplex-ANHYDREX XX should be your choice.

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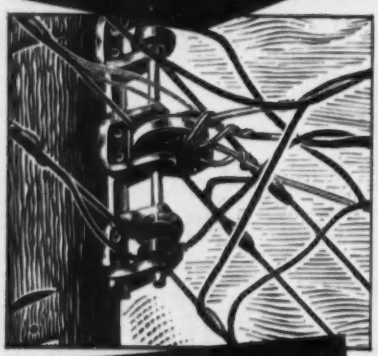

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NEWS ABOUT PEOPLE

Raver Accepts Seattle Post; Pearl New Bonneville Head

Dr. Paul J. Raver, Bonneville Power administrator for the past 15 years, resigned last month to accept the position of superintendent of Seattle City Light, left vacant by resignation of **E. R. Hoffman.**

William A. Pearl, director of the Institute of Technology at Washington State College, was named to head the Bonneville Power Administration.

Pearl is a native of Kent and a graduate of Washington State College, where he was acting president in 1951-52. He began his engineering career as an apprentice instructor at the Bremerton Naval Shipyard in 1918 and 1919. The following year he joined the WSC experimental station engineering staff and became an assistant professor. In 1936 he became director of engineering at the Armour Institute of Technology in Chicago and a member of the Armour Research staff. He also served on the faculty of the Illinois Institute of Technology during 1940-44. In 1947 he returned to WSC as director of the Institute of Technology and director of research.

Raver has served as Bonneville administrator since 1939, following the death of J. D. Ross. He was born in Indiana and received a civil engineering degree from the University of Nebraska in 1917, a business administration degree from Northwestern in 1933. Following service in World War I, he became an estimating engineer in Chicago. In 1927 he was made instructor in public utilities at Northwestern, rising to full professor and taking charge of all public utility research and courses. He served as chairman of the Illinois Commerce Commission and was a member of the Illinois State Rural Electrification Committee.

Raver's appointment, which is effective Jan. 15, is for a four-year term.

• **James F. Magin,** formerly with Square D in Los Angeles and San Francisco, has been elected vice-president of the company. His headquarters are in Milwaukee.

• **Kirby Billingsley,** formerly managing editor of *The Wenatchee World,* has been appointed manager of the Chelan County PUD at Wenatchee, Wash. He has been a member of the PUD board.

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J. Frank Ward Made Director of Washington Power Commission

J. Frank Ward, Tacoma City Light superintendent since 1947, was appointed first managing director of the Washington State Power Commission, authorized by the 1953 state legislature and recently organized with **Walter S. Gordon** of Tacoma as chairman.

Ward had been considered for another new position, that of director of public utilities at Tacoma. The state job pays slightly less, $15,000, compared to the $15,120 Ward was getting as City Light head and to the $16,000 to be paid the Tacoma director of utilities.

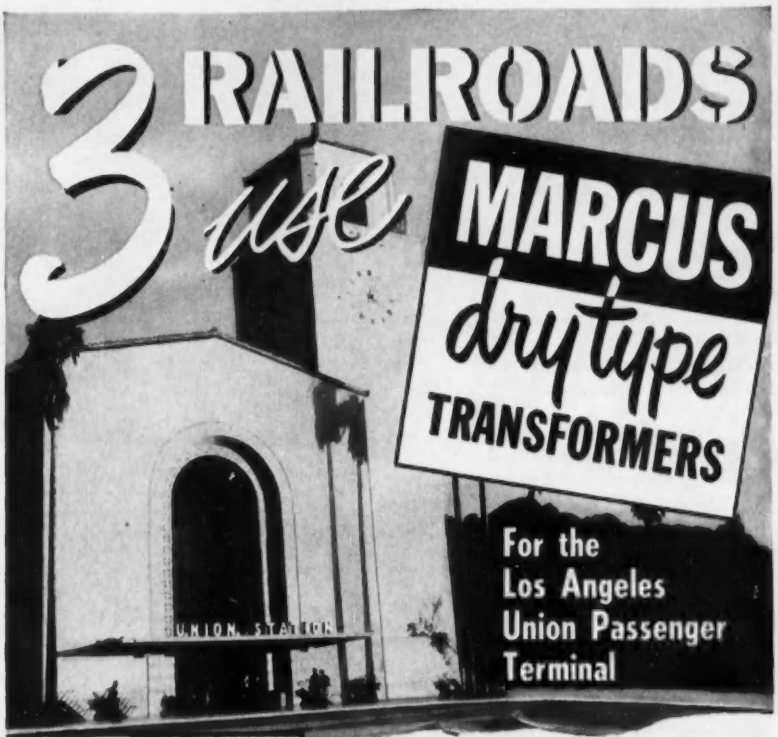
Before he took the Tacoma post, Ward had been in private engineering work in Seattle since 1918. His resignation with the city will take effect not later than Feb. 28.

• **Gifford M. Randall** has been placed in charge of development work for Kaiser Engineers on industrial and government engineering and construction projects on the West Coast. He will be located at the firm's 1924 Broadway, Oakland, headquarters. Randall joined the Kaiser organization in 1942 as senior engineer on design and construction of the first installations at the Kaiser Steel Plant at Fontana, Calif. In 1945 he became office engineer for Kaiser Engineers, and since 1950 has acted as project engineer for design and construction of the recent expansion of Permanente cement plant, Kaiser Foundation hospitals in Los Angeles and San Francisco, and other projects.

• **Charles F. Monson** has been promoted from assistant to superintendent of system operations for the Puget Sound Power & Light Co., succeeding **Wiltse Mathis,** who retired June 1. A graduate electrical engineer, he joined the company as a student engineer 14 years ago, became assistant to the executive vice-president in 1943 and assistant operating superintendent in 1949.

• **Harry W. Bashore** of Mitchell, Neb., has resigned as federal government representative on the Upper Colorado River Commission. Bashore has served on the commission since its formation four years. He said he was resigning because he is "otherwise busily engaged."

• **V. McN. Rolfe,** who recently retired as chief electrical inspector for the City of Victoria, B. C., is acting as temporary assistant to **F. M. Kempton,** district inspector for the British Columbia government electrical department at Victoria.



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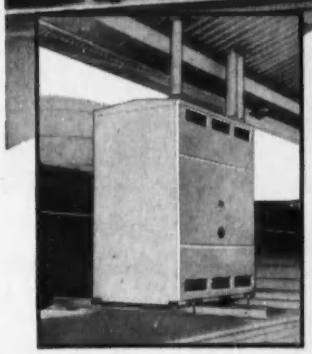

Specifications for the stringent power requirements for Los Angeles Union Passenger Terminal were set up by a group of electrical engineers representing the three railroads that operate the terminal, and were met by the purchase of Marcus dry type Transformers.

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PG and E Announces Personnel Changes

George H. Hagar has been appointed vice-president in charge of electric operations of Pacific Gas and Electric Co. He has been a vice-president since last July.

The company also announced retirement of **W. G. B. Euler,** executive vice-president and former vice-president and general manager, as of Dec. 31 under the company's pension plan. He has had over 43 years of service with the PG and E system and has served as a director during the past five years.

Hagar, a graduate of the University of California in electrical engineering, has been with the company 33 years.

• **Appointment of Harry A. Lee** as San Francisco division manager of Pacific Gas and Electric Co. was announced last month. He succeeds **Grover S. Tracy,** who retired Dec. 31. Lee had been San Francisco division sales manager since 1946 and for 20 years before that was sales manager in two other company divisions—Shasta and Stockton. Tracy's entire 48-year experience with PG and E has been in San Francisco. He left school at 16 and went with the company three months after the earthquake and fire in 1906. In 1924 Tracy became the first manager of the division's service bureau. In 1930 he was appointed division office manager, was moved up to assistant division manager in 1945 and became manager in 1947. He had been president of the Employees Credit Union since its inception in 1936.

• **W. L. (Larry) Greer** was transferred from Sacramento to San Francisco as commercial manager of Pacific Gas and Electric Co. succeeding Harry A. Lee. Greer had been commercial manager of the Sacramento division since 1946 and previously had been sales manager of the De Sabla division at Chico for two years. He started with the company in 1922 as a gas construction mechanic.

• **Fenton Y. Kraft,** manager of Pacific Gas and Electric Co.'s Jackson district, succeeded **William R. Bowler** as Colgate division manager on Jan. 1. Bowler will become manager of the utility's San Jose division. Kraft has served as manager of three districts—Manteca (1932 to 1941), Modesto (1941 to 1951) and Jackson (1951 to 1953). His 35-year career with PG and E also included service in San Francisco and the Stockton division. Headquarters of the Colgate division are at Marysville.

Lee

Tracy

• **Portland General Electric** Co. has announced appointment of **Rolland J. Gabel,** formerly with Don Allen and Associates advertising agency, to its public relations department. Gabel's primary job will be editing PGE's interior personnel publication *The Bullseye*. Gabel takes the position held by **D. Donald Lonie** Jr., who resigned to join the promotion staff of KPTV.

• **Jack W. Rodner,** former head of the Bureau of Reclamation office in Fresno, Calif., has accepted a position as manager of the Westlands Water District with headquarters in Fresno. The appointment followed his resignation from the bureau's lower San Joaquin Valley office, a post he was chosen for in 1946. Rodner's main task as Bureau office chief in Fresno was taken by his assistant, **Edwin F. Sullivan.**

• **Clarence Kommers** of Great Falls was transferred recently to Havre, Mont., to be the Montana Power Co. new business department manager there. John Quinn takes Kommers' place at Great Falls.

San Diego G&E Realigns Top Management Posts

San Diego Gas & Electric Co. announced a major realignment of top management, induced by retirement of **L. M. Klauber** as chairman of the board and chief executive officer.

At the same time it was announced that the firm's board of directors has amended its by-laws to abolish the position of chairman of the board.

E. D. Sherwin, already president, takes on the added title of chief executive officer of the company. **H. G. Dillin,** formerly vice-president in charge of sales, becomes executive vice-president, a newly created position, and a member of the board of directors.

The company also appointed **Ralph J. Phillips** to succeed Dillin as VP-sales. He formerly was manager of sales.

Klauber remains as a member of the board of directors and will continue to sit in top management councils as a member of the new executive committee, along with Sherwin and Dillin.

Dillin replaces **Hance H. Cleland** as a member of the board of directors.

Deaths

• **John Milton Dodds,** 61, General Electric Co. consulting engineer, died Dec. 3 at his Los Altos, Calif., home. A graduate of the University of Washington in 1915, Dodds had been with G-E since his graduation, except for two years during World War I, when he served in the U. S. Navy as an electrical officer on the U.S.S. Salem in the Atlantic Fleet. During World War II he supervised installations on naval ships on the West Coast.

• **The Rev. Dr. George W. Allison,** 71, head of the research department of the Puget Sound Power & Light Co. from 1943 to 1947 and previously for 14 years with the Edison Electric Institute in New York, died Dec. 10 at Seattle. He was a Baptist minister for many years.

• **Elwood M. Miller,** 62, founder of the E. M. Miller electrical contracting business in North Sacramento in 1926, died in Sacramento, Calif.

• **John O. Binney,** 53, Southern California Edison Co. electrical engineer, died recently in Los Angeles. At the time of his death, Mr. Binney, who had been with Southern California Edison for 20 years, was senior communication engineer for the company's Alhambra, Calif., communications department.

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NOTES ON THE TRADE

• **Keeping step** with growth in the West, Hubbard and Co. is building a $400,000 addition to its Emeryville, Calif., plant. Third addition since the plant was built in 1924, the new construction will add 37,000 sq ft of plant in two buildings. According to **Marshall Lasher,** vice-president in charge of the Emeryville operation, the new buildings will give added manufacturing facilities and better arrangement of plant and are designed to improve service, quality and production schedules. The new plant is now about one-third complete and is expected to be ready for service in April.

• **David W. Nurse,** formerly with Okonite in the San Francisco and Portland offices, has been made vice-president in charge of manufacturing of the company's three factories.

• **Celebrating** the fifth anniversary of General Electric Co.'s San Jose, Calif., manufacturing plant, an open house was held recently. Visitors streamed through the $4,000,000 plant all day, while full production was maintained.

• **Orangeburg Mfg.** Co. has dedicated its $2,500,000 plant at Newark in Alameda County, Calif. The 85,000-sq-ft installation will employ about 100 people initially.

• **I-T-E Circuit Breaker** Co. of Philadelphia, Pa., has acquired Victor Insulators Inc. of Victor, N. Y., manufacturer of high-voltage electrical porcelain insulators.

• **Platt Electric Supply** Inc. has been formed at Portland, with offices and warehouse at 103 N. W. 14th St. The firm is equipped to service contractors and industries with a line of wholesale electrical, neon and allied supplies. The 12,000-sq-ft building also will house a lighting equipment department. **Morris Platt** is president and general manager. Others in the firm are **I. Platt,** formerly manager of the Seattle branch of Gilbert Bros., **Harry Nemer,** buyer for the electrical department, **Mark Schnitzer,** manager of the lighting and lamp department. Among the lines it will carry are those of U. S. Rubber Co. and Sylvania Electric Products.

• **William Weston** & Co., manufacturers' agent, has moved to 1301 47th Ave., San Francisco 22.

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Pengilly

• **Lawrence G. Maechtlen,** vice-president of Square D Co., has been named manager of its Western division and Vice-president **J. H. Pengilly** has been named chairman of the Western division's executive committee. Maechtlen, a director and vice-president since 1951, started with the company in 1926. Pengilly was with Southern California Edison before joining the old Square D Co. in 1919. In 1936 he was elected a vice-president and director of Square D.

• **James M. Humphrey** has been named district sales manager for the Denver area by Appleton Electric Co. He previously was with the Young Electric Mfg. Co. **I. W. Strong,** former Denver sales manager, has been appointed assistant to the vice-president in charge of sales for Appleton and has been moved to the Chicago home office.

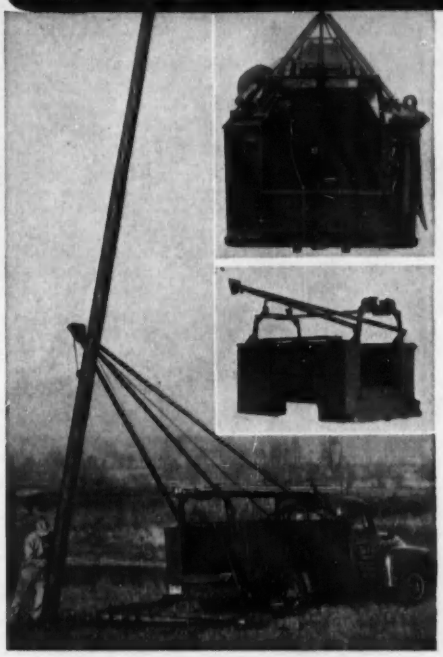
• **Maydwell & Hartzell** Inc. announces the following appointments effective Jan. 1: **F. A. (Fred) Mulvany,** vice-president and general manager; **Eugene Braun,** vice-president and assistant general manager. **H. F. Hartzell** will continue as president and chairman of the board.

• **General Transformer** Co. of Homewood, Ill., has appointed **Win W. Tompkins** as its representative in northern California and Reno, Nev. His address is 941 Newell Road, Palo Alto, Calif.

• **Gordon W. Laursen & Son** of Albuquerque, N. M., is now sales agent in New Mexico and west Texas for Pittsburgh Standard Conduit Co.

• **S. A. Nelson** has been appointed resident sales engineer for General Electric Co.'s new apparatus sales office in Wenatchee, Wash.

Two-Man COMBINATION TRUCKS Pay Dividends



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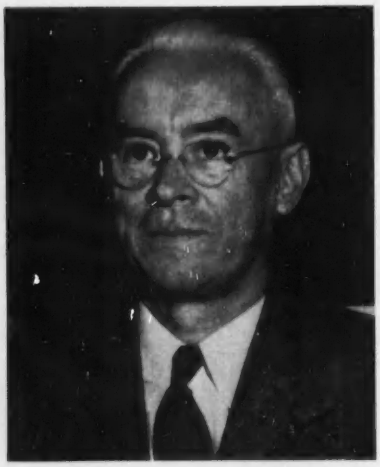
PROFILES

Frank E. Boyd, president of Pacific Electric Motor Co. of Oakland, Calif., was honored at a dinner celebrating his 25th anniversary with the company and his 50th year in the industry. John Peterson, 33-year veteran, presented a silver platter from staff members

Peterson Boyd

Below: Western winners in the 4-H Farm and Home Electric program sponsored by Westinghouse examine a better wiring exhibit. From left: Marie E. Klusman, Colorado; Elsie L. Johnson, Montana; Elnora J. LeGrant, Washington; Larry A. Maguire, Oregon; Dewey A. Baars, Wyoming; Marvin D. Harris, California; Ellic Bunney, Idaho; LaVere W. Rawlins, Utah; Henry E. Tietje, Nevada. Harris was a national winner; all the others were state winners

J. Frank Ward, Tacoma City Light superintendent, will become managing director of the Washington State Power Commission



W. A. Pearl of WSC succeeds Paul J. Raver as Bonneville administrator. Dr. Raver is the new Seattle City Light superintendent

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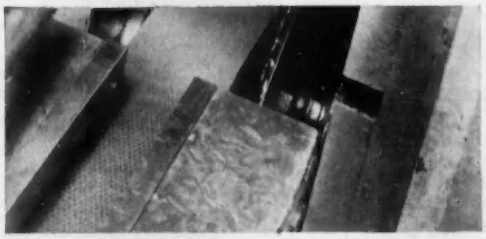
"INCH-MARKING" is an exclusive Republic feature on all popular sizes. When inch-marks are lined up with markings on the Republic Bender, and the Bending System is followed, journeymen can make smooth, accurate saddle bends, stubs, back-to-back bends and true offsets. Jobs go in easily, economically.



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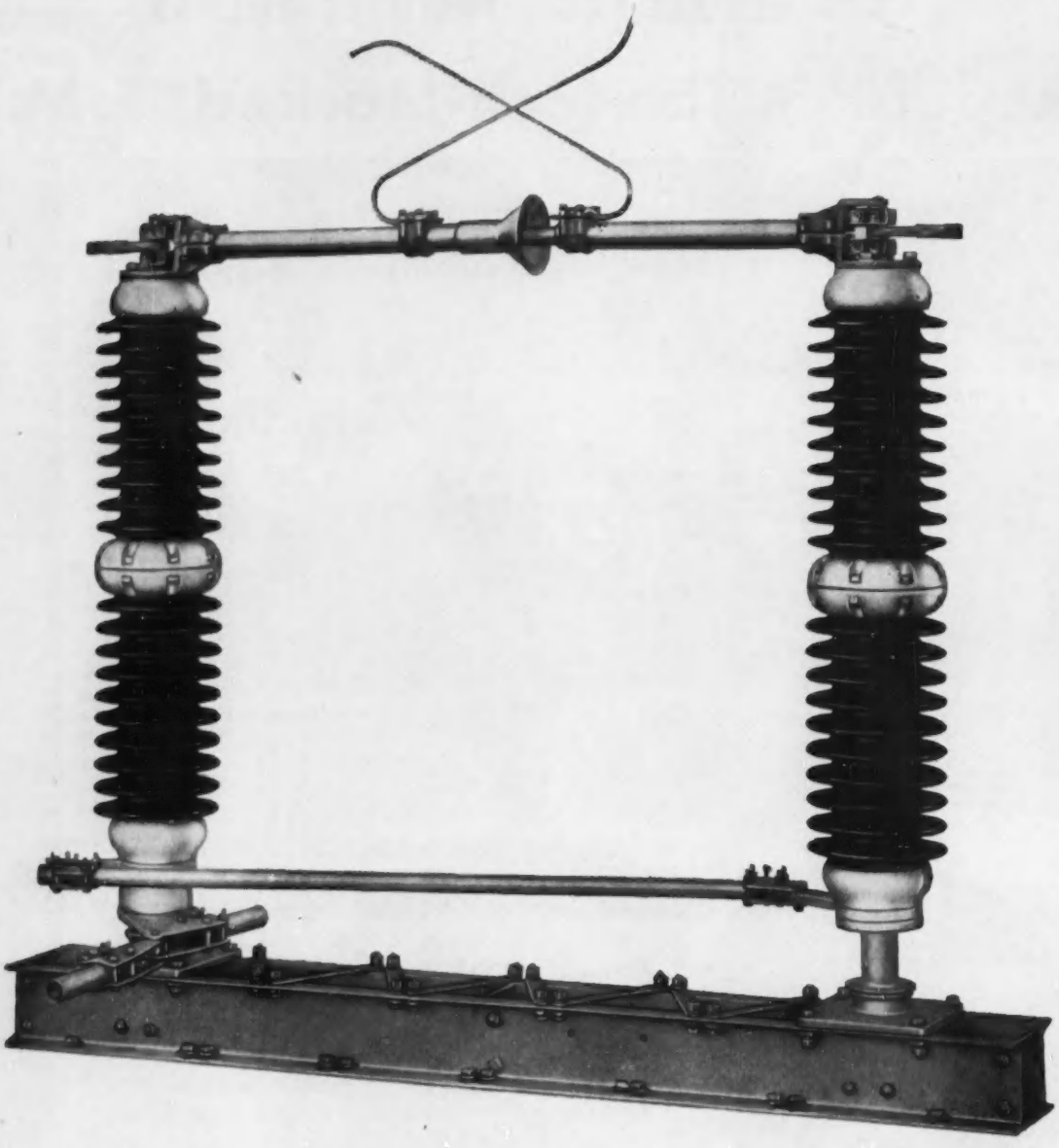

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Last year, before Arcata put in its new lighting, G Street looked like this. The 1920-model electroliers were too short and too few to do an adequate job, and the brightness of their lamp units was insufficient by present standards.

Today, since the city has put into effect the findings of a lighting survey, the same street is far safer for nighttime travel.

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For a survey of your city's street lighting, contact your local P. G. and E. Office

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